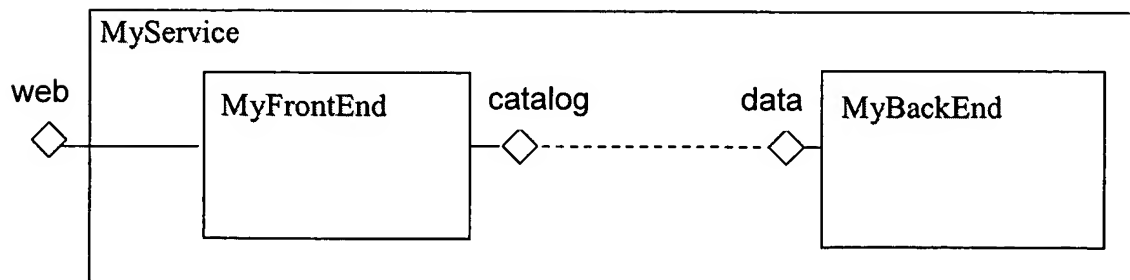
*Fig. 1**Fig. 2*

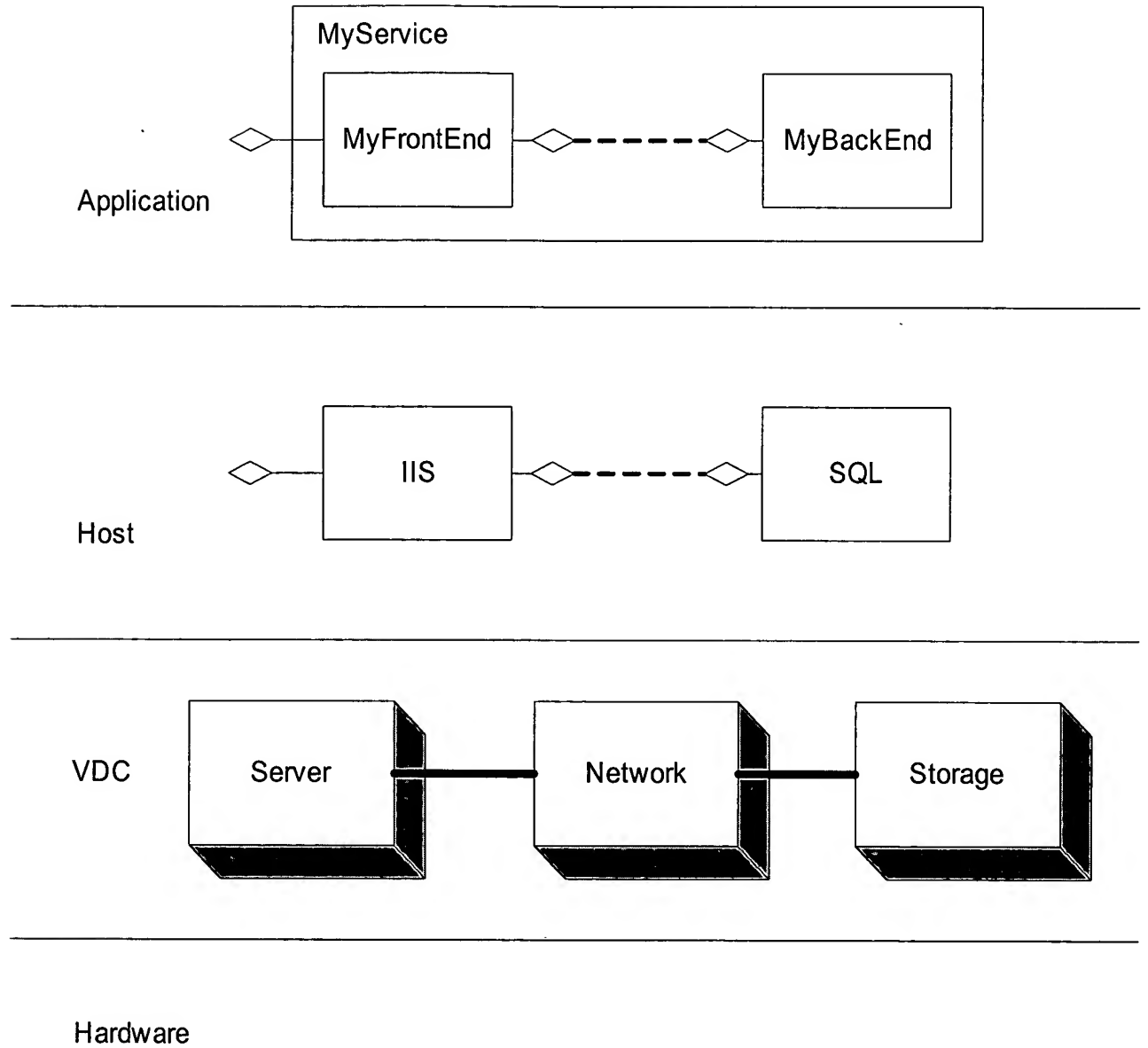


Fig. 3

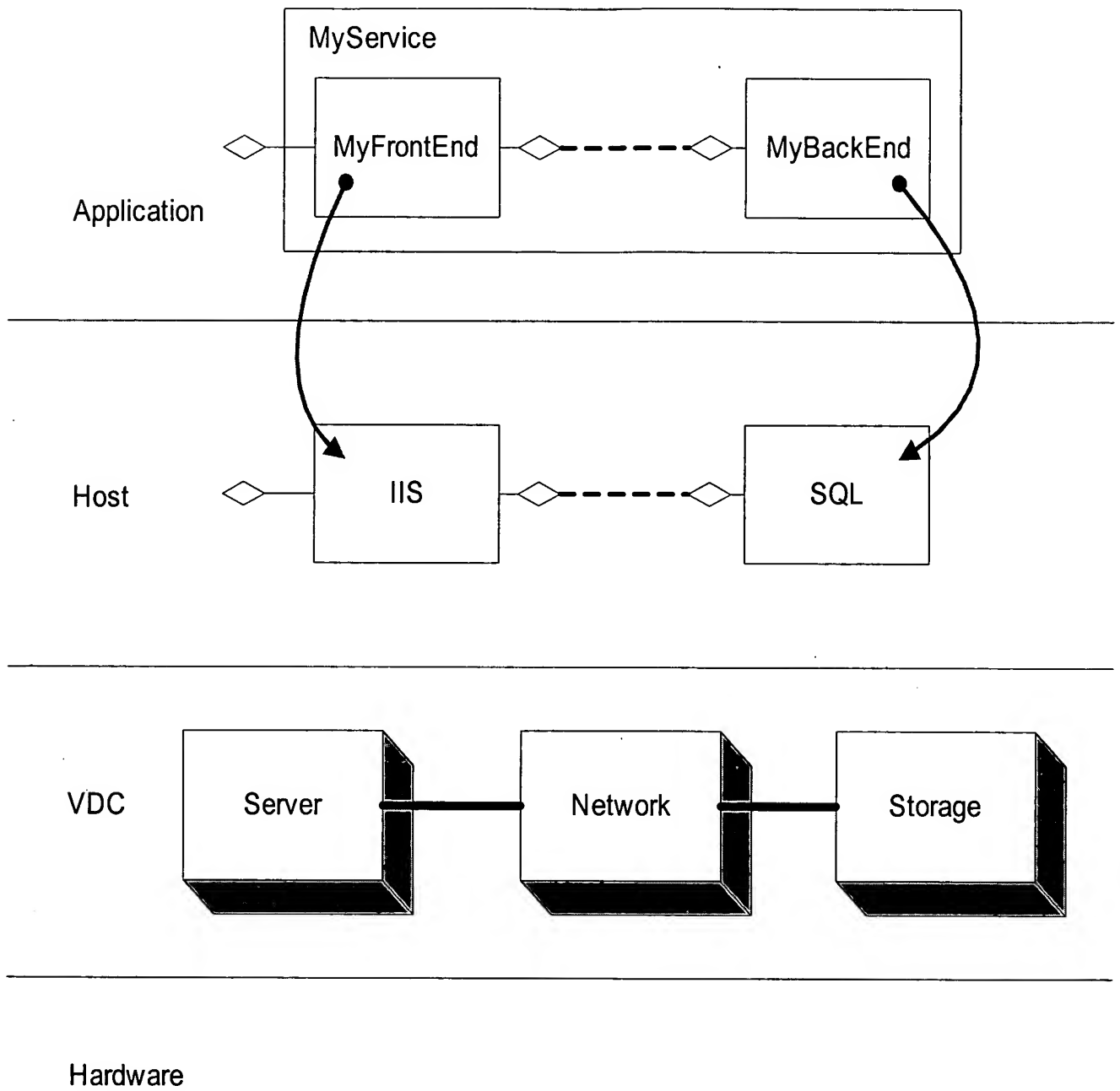
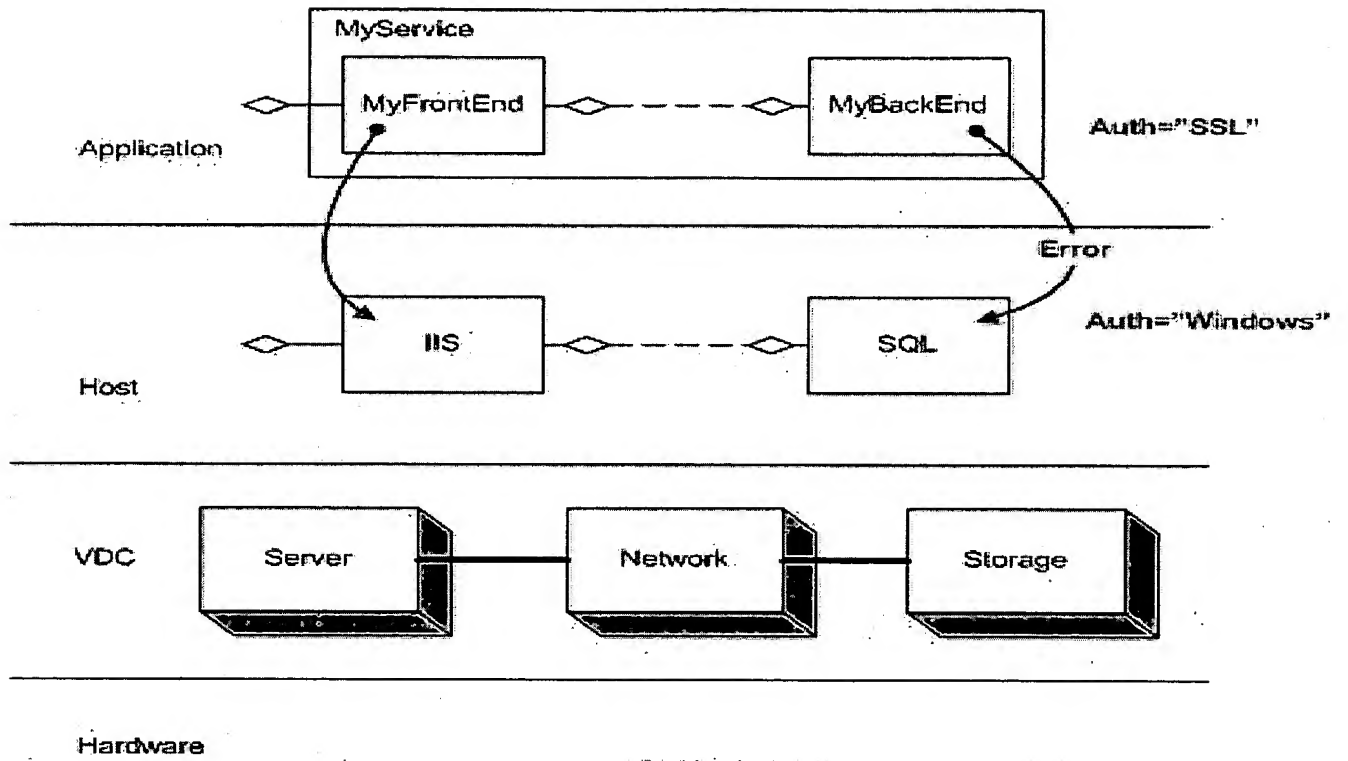
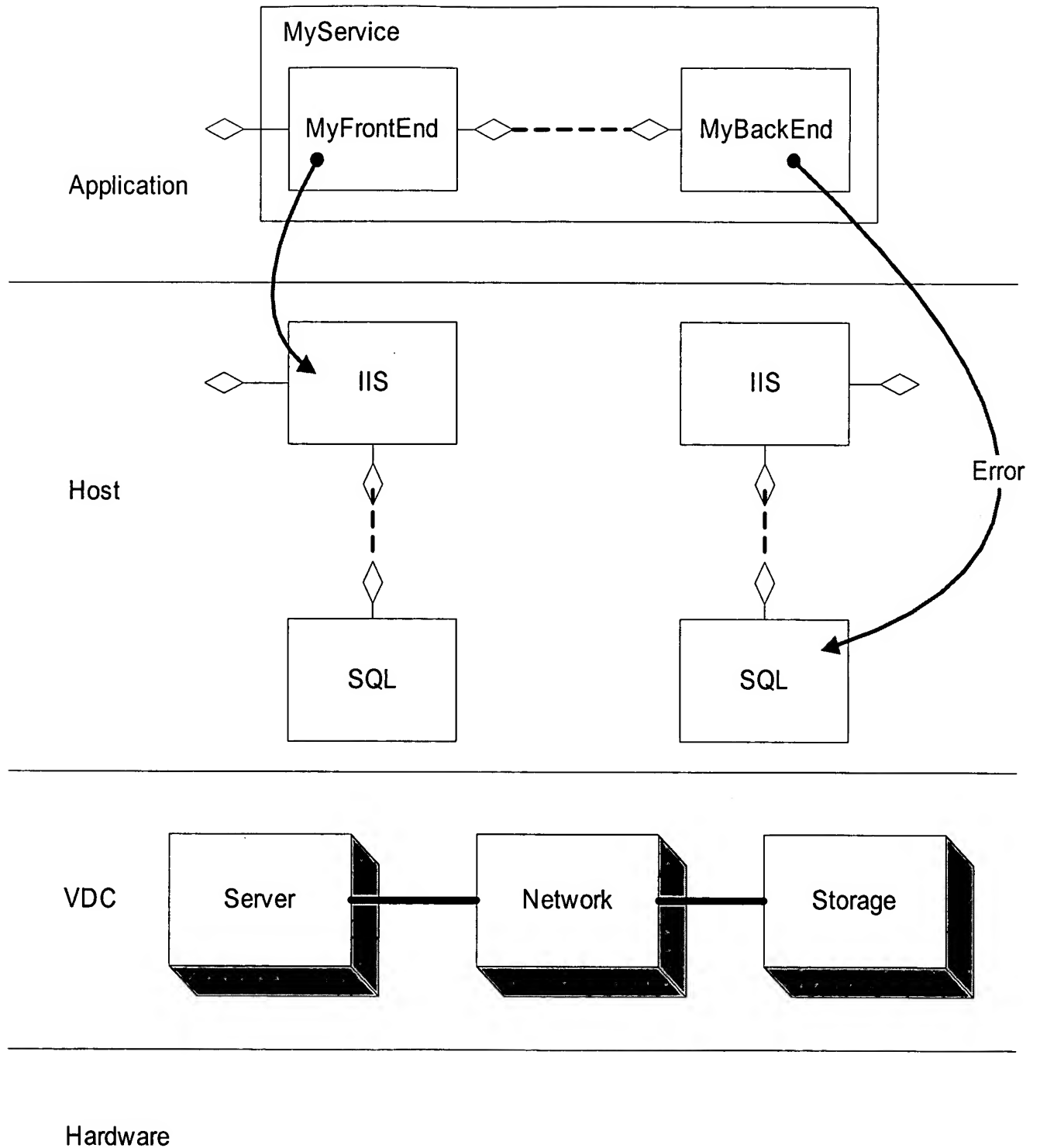
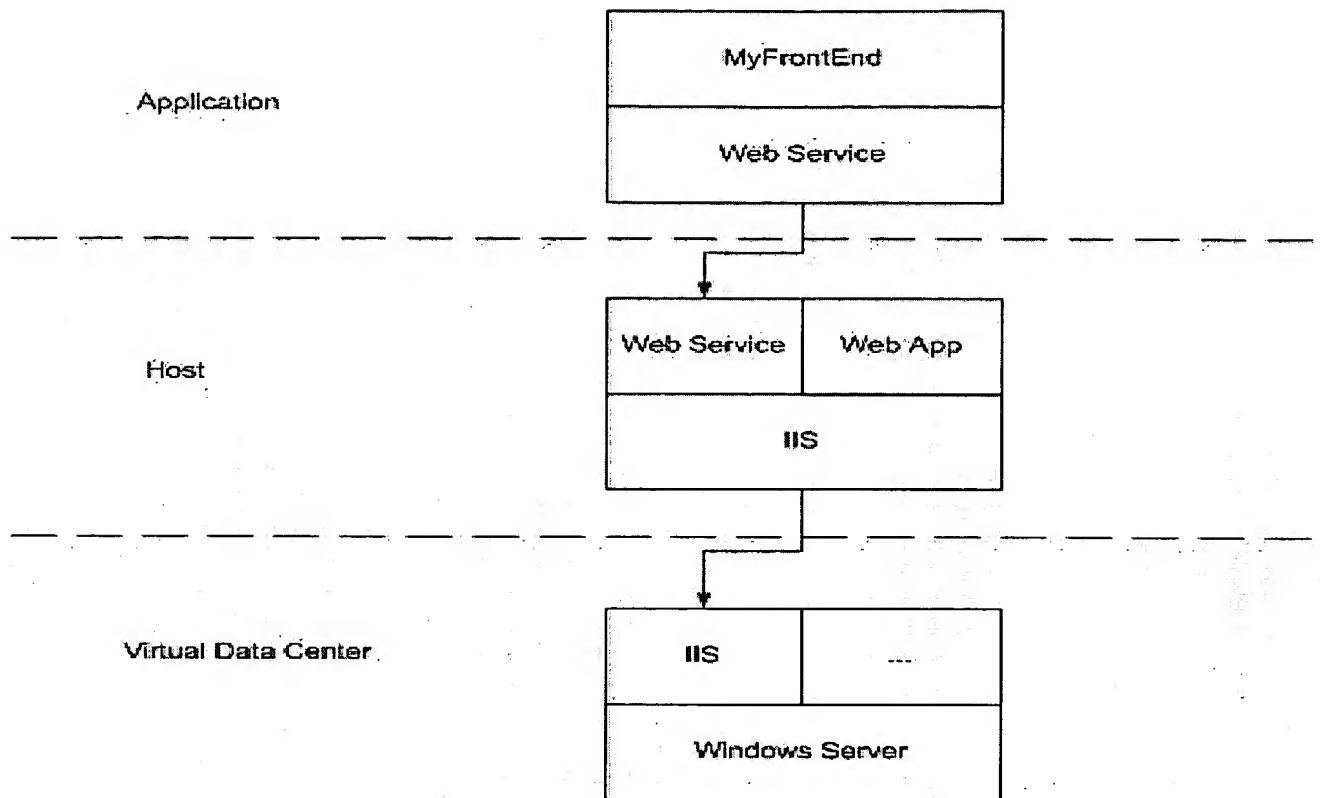
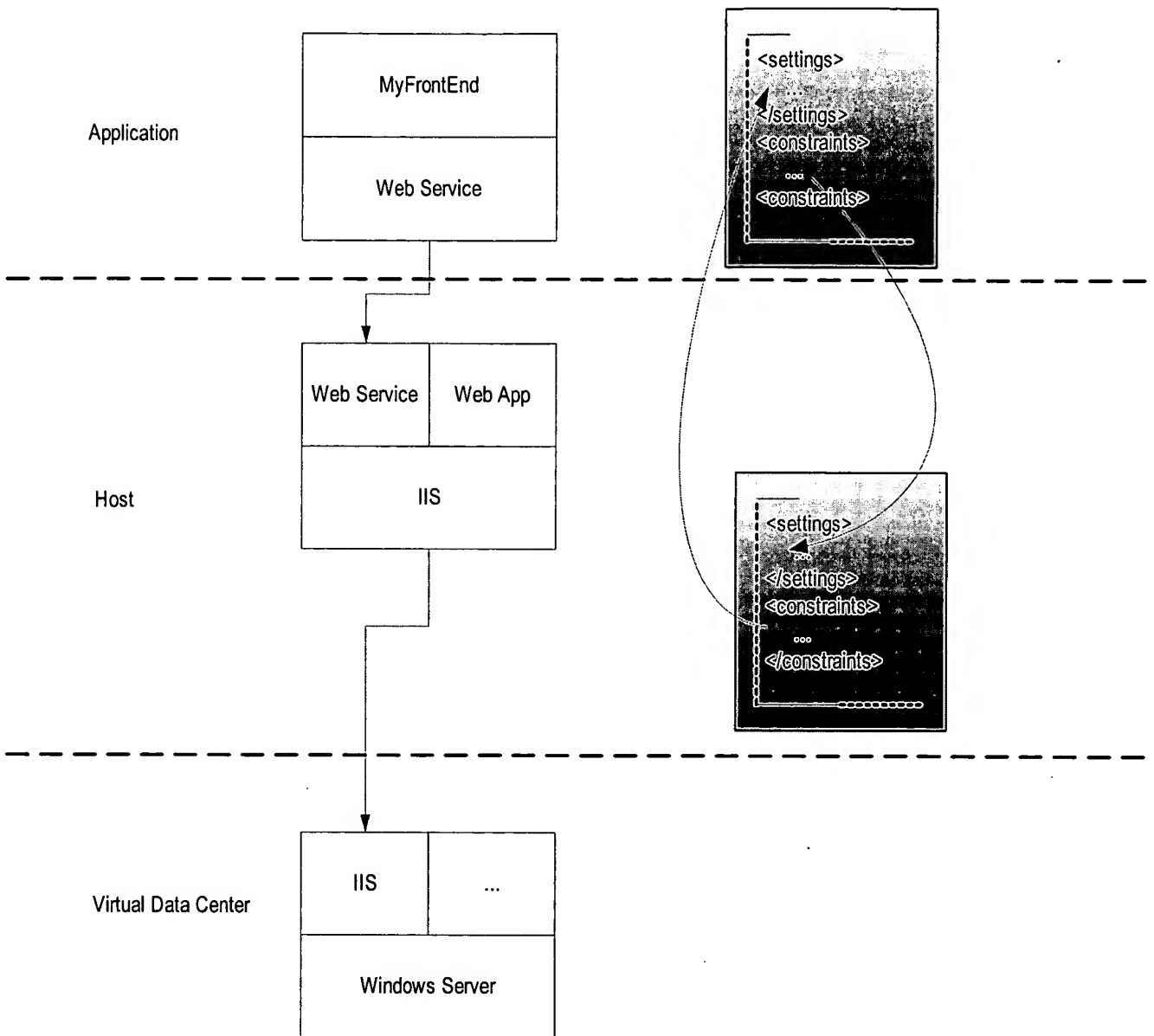


Fig. 4

*Fig. 5*

*Fig. 6*

*Fig. 7*

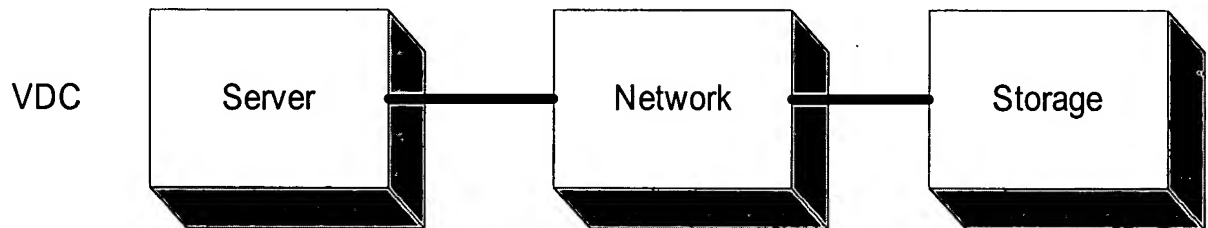
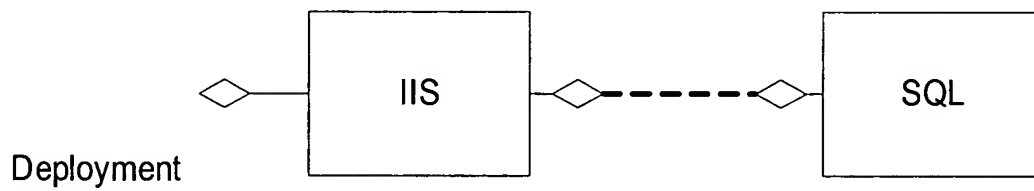
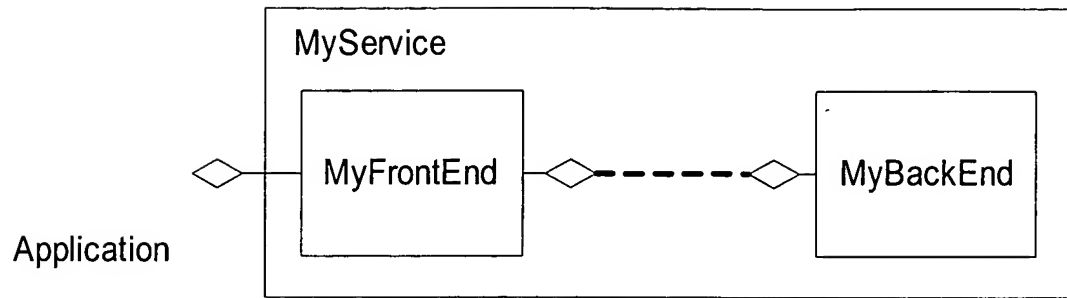
*Fig. 8*

Settings Schema	Deployment Manifest	Port Implementation Reference
--------------------	------------------------	----------------------------------

Fig. 9

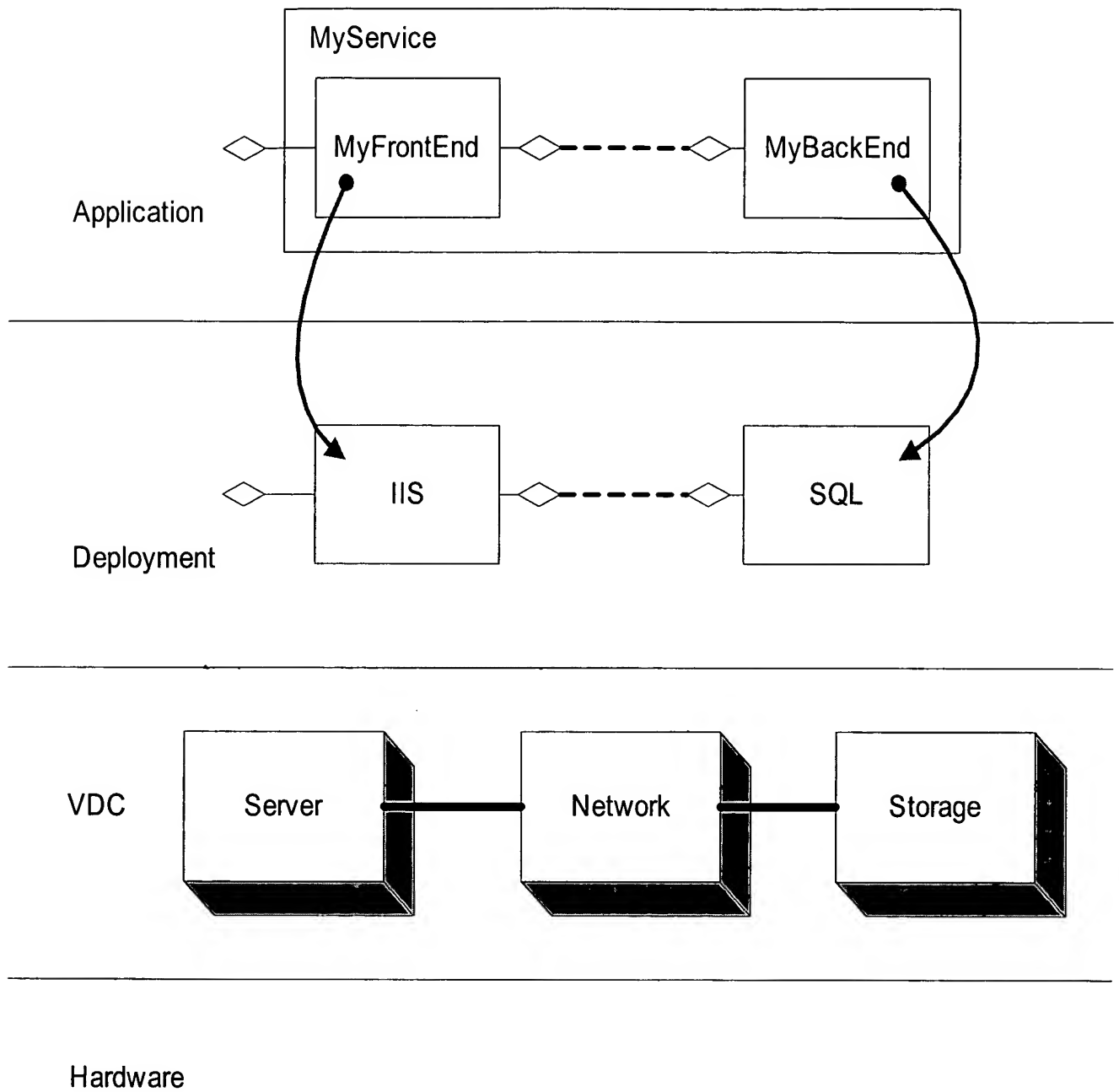
Settings Values	Deployment Values	Constraints Values	Port Types or Hosted Type List
--------------------	----------------------	--------------------	--------------------------------------

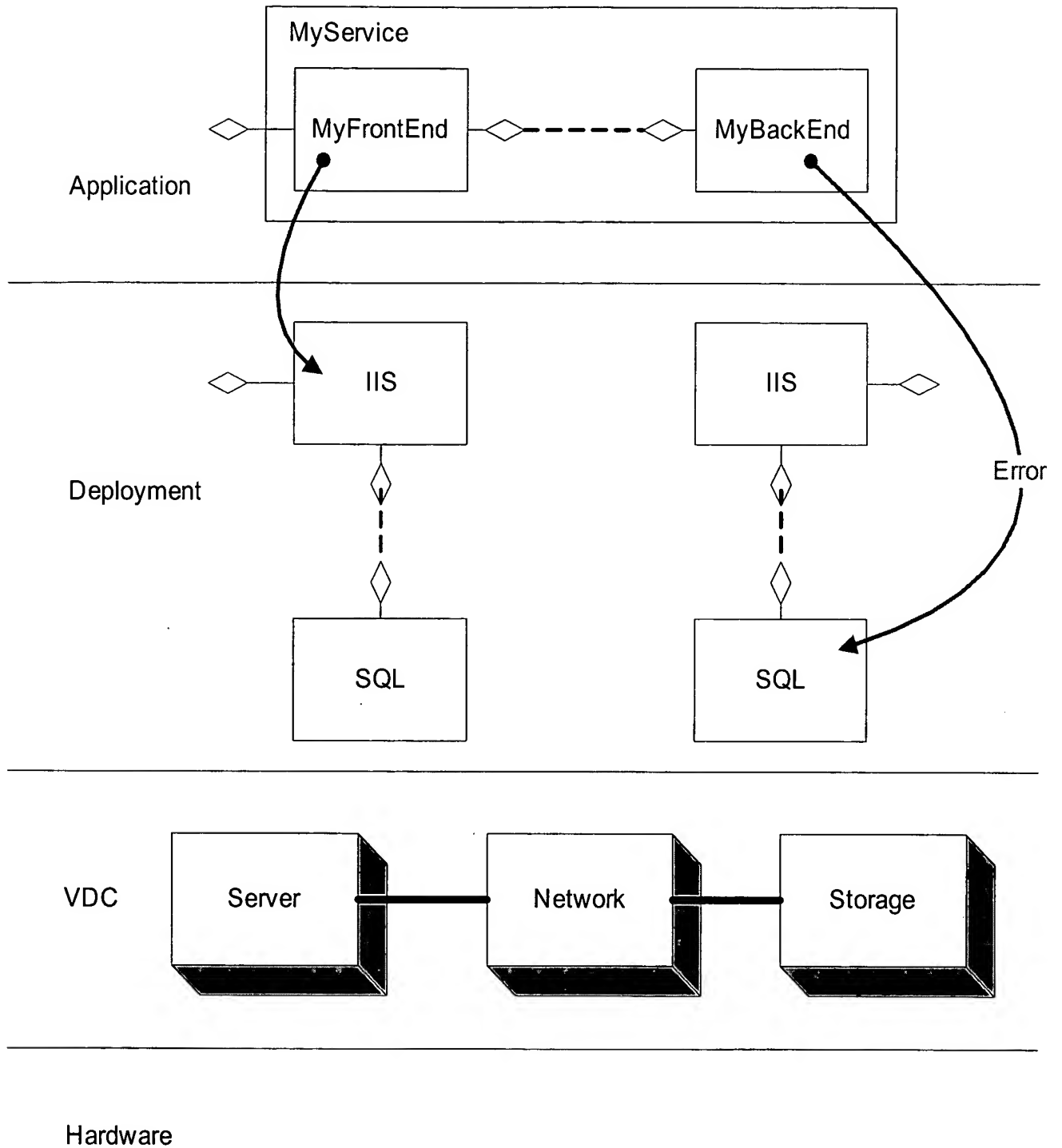
Fig. 10

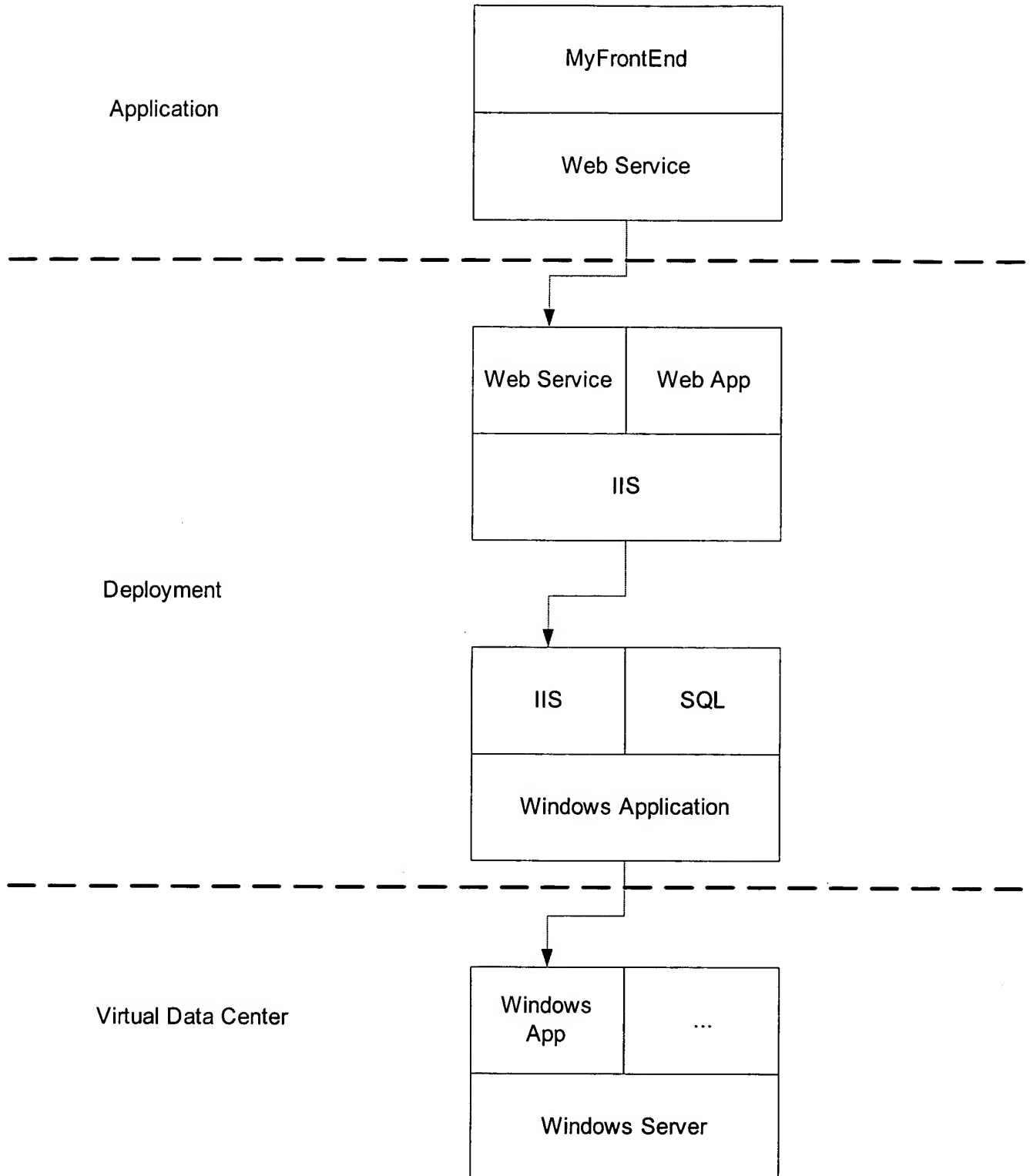


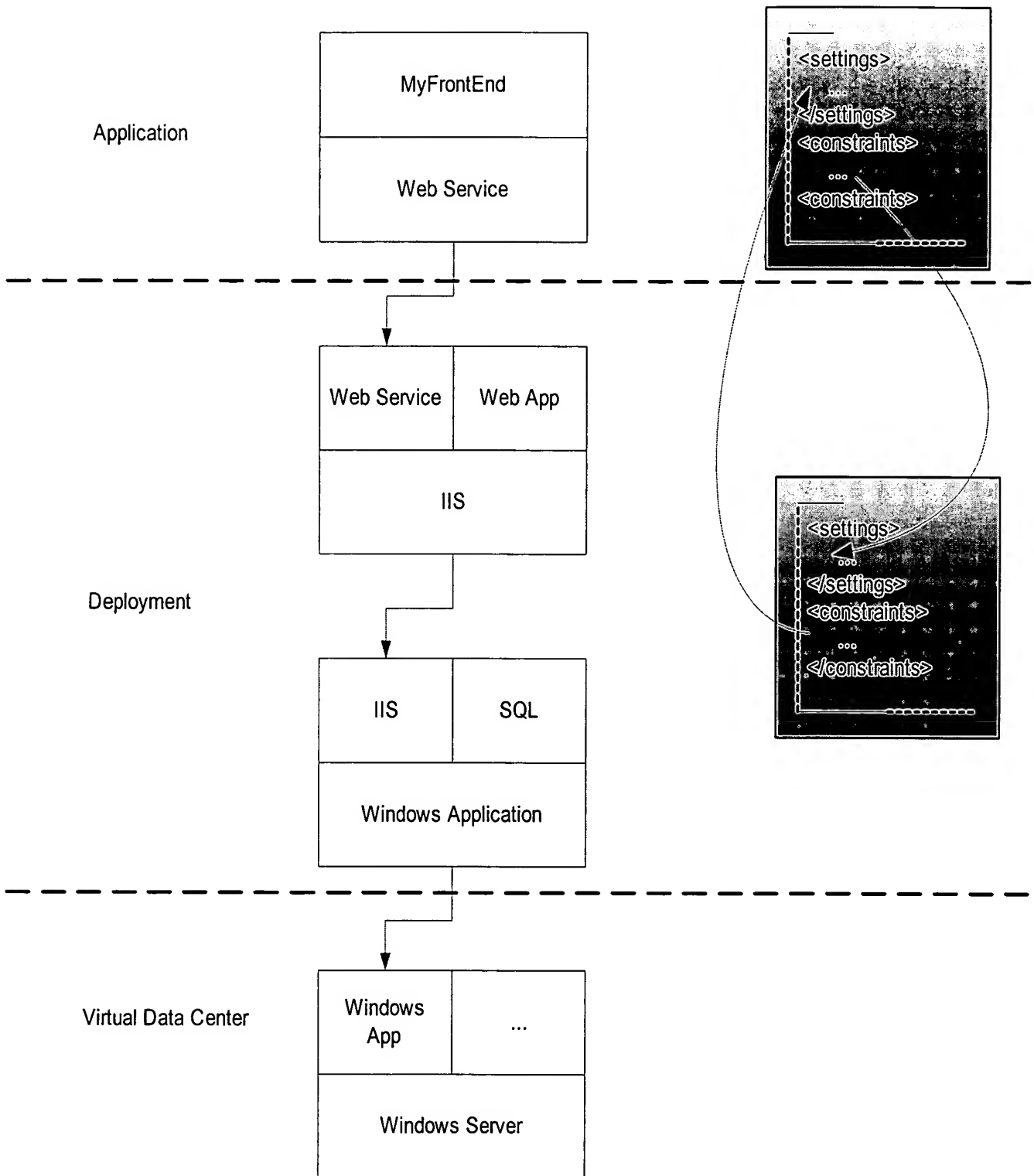
Hardware

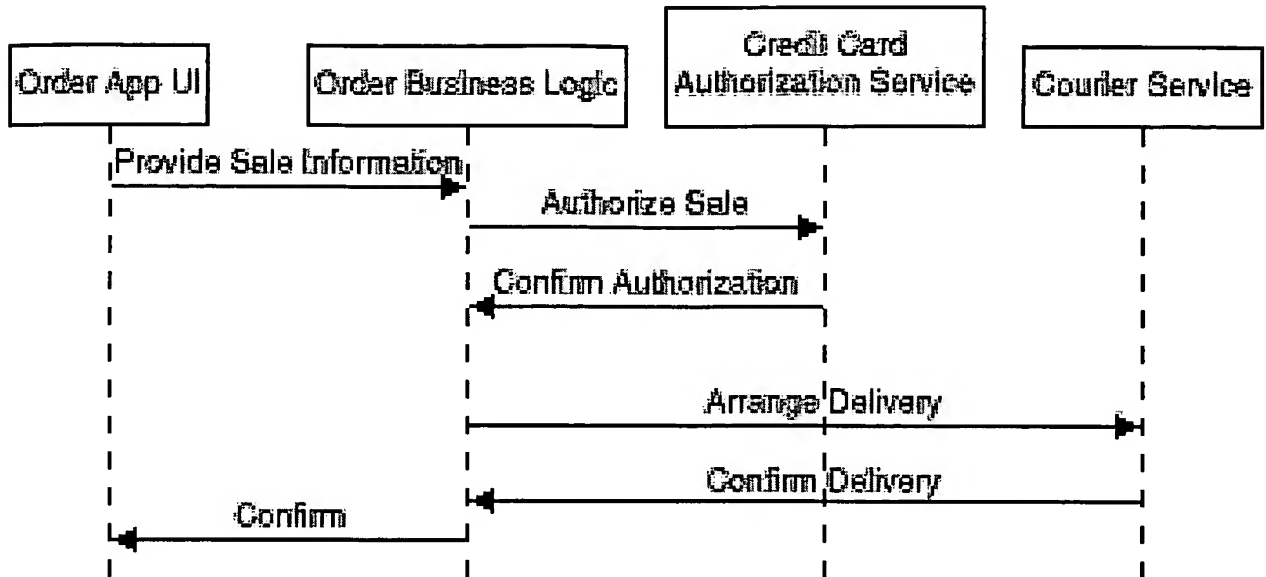
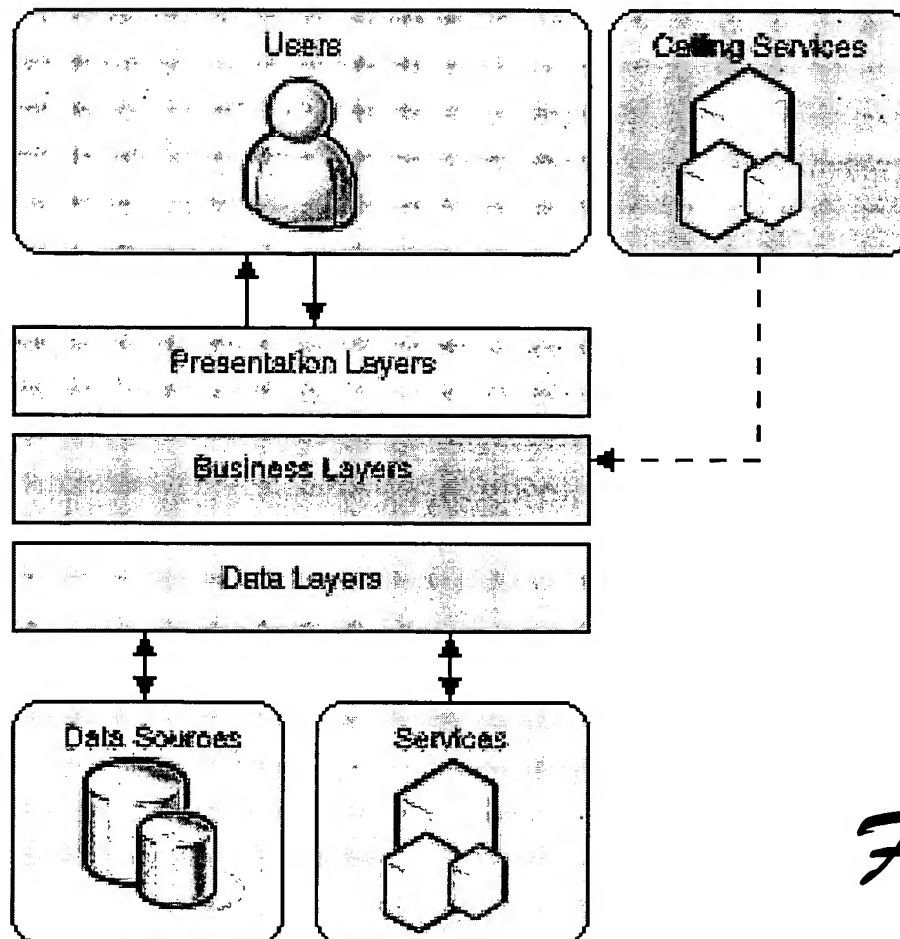
Fig. 11

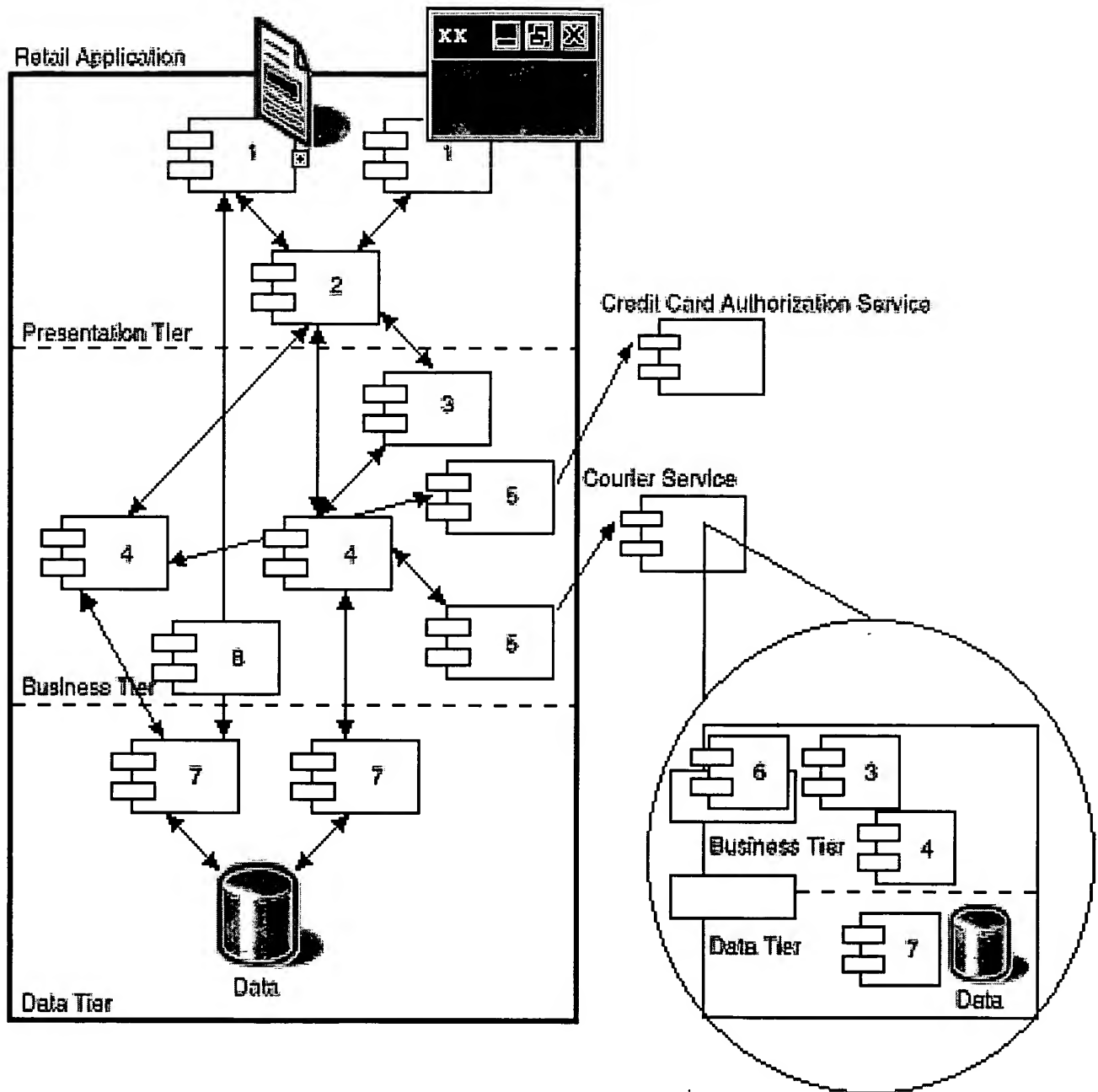
*Fig. 12*

*Fig. 13*

*Fig. 14*

*Fig. 15*

*Fig. 16**Fig. 18*

*Fig. 17*

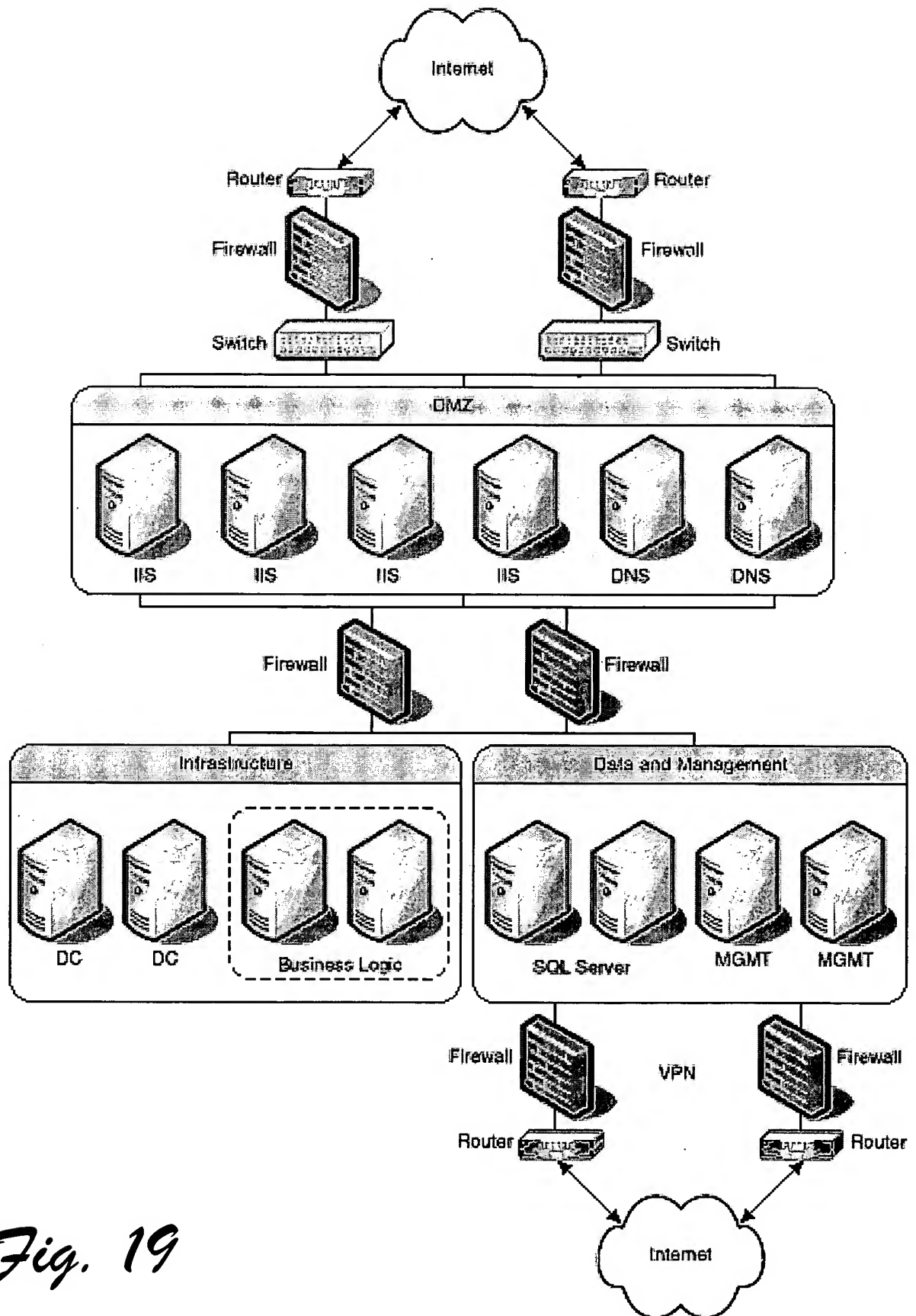
*Fig. 19*

Fig. 20

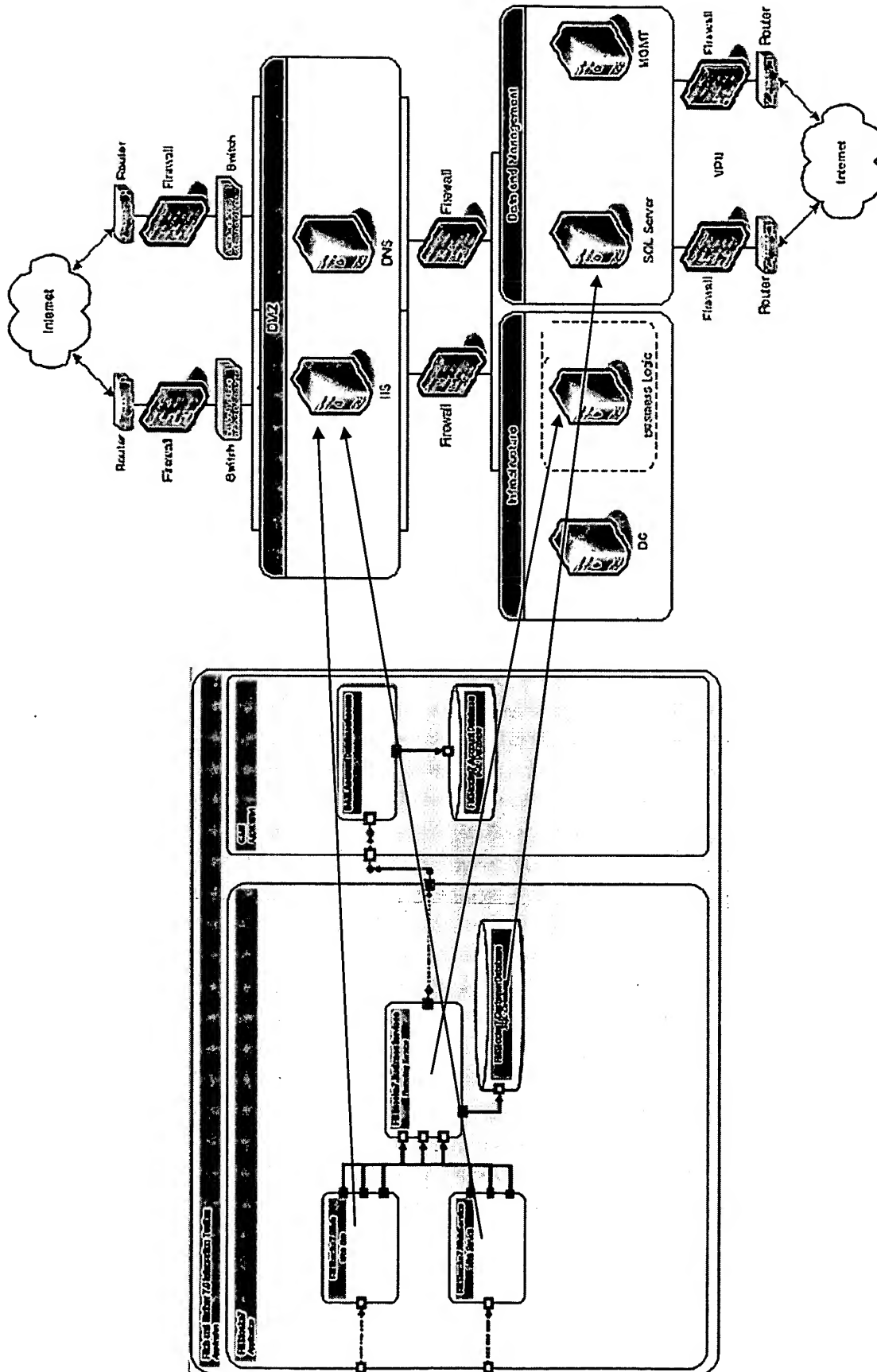
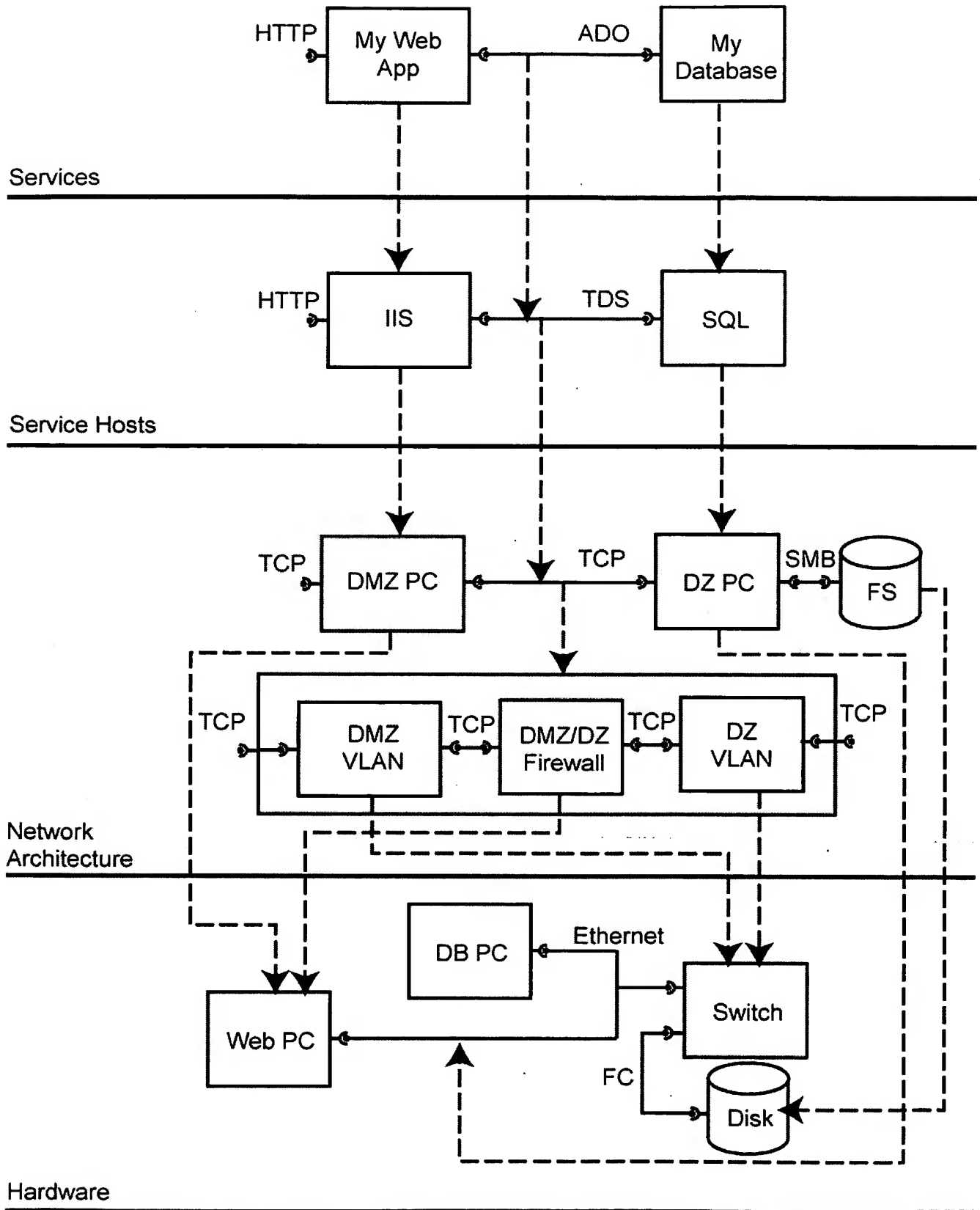
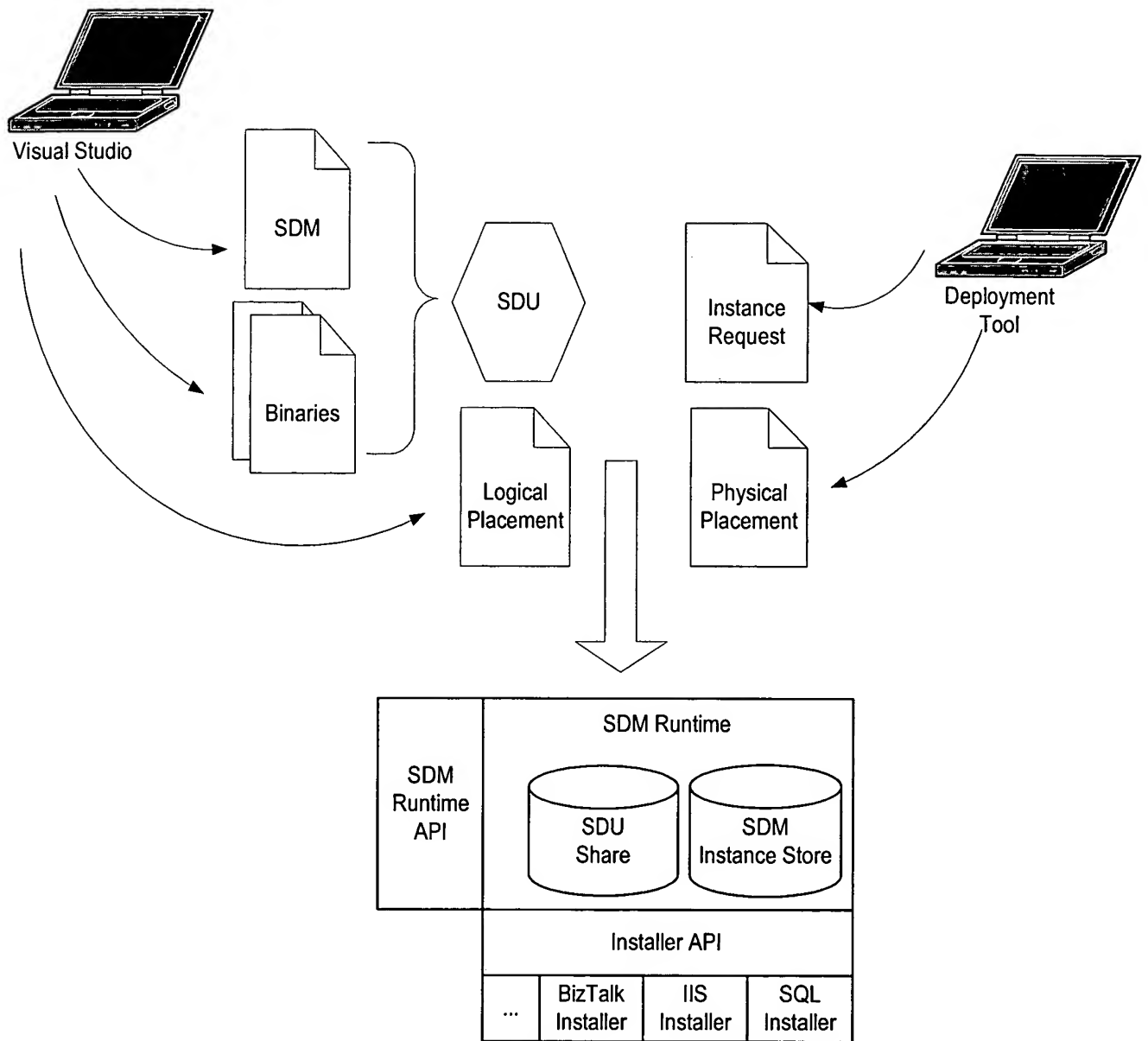


Fig. 21

*Fig. 22*

*Fig. 23*

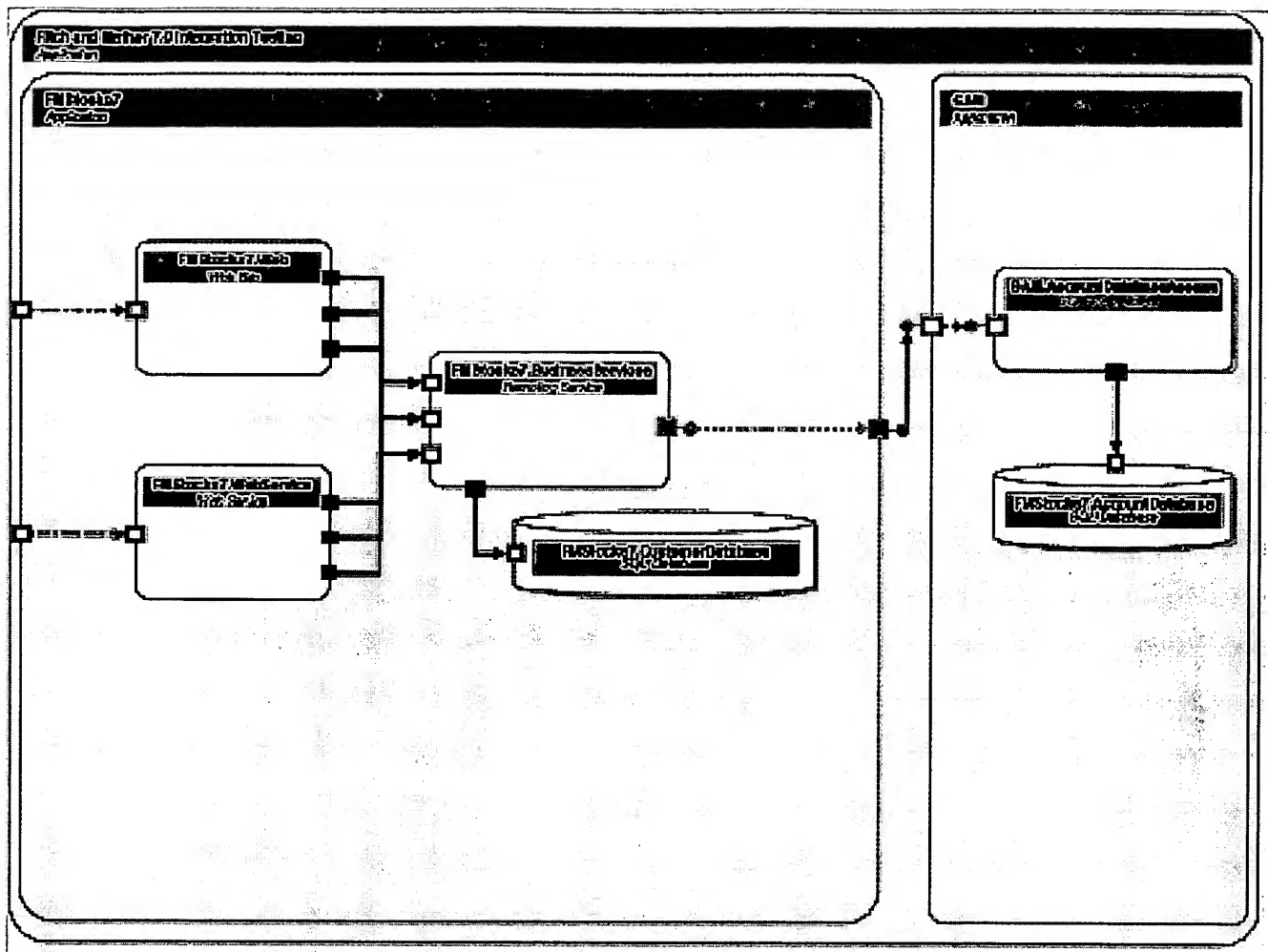


Fig. 24

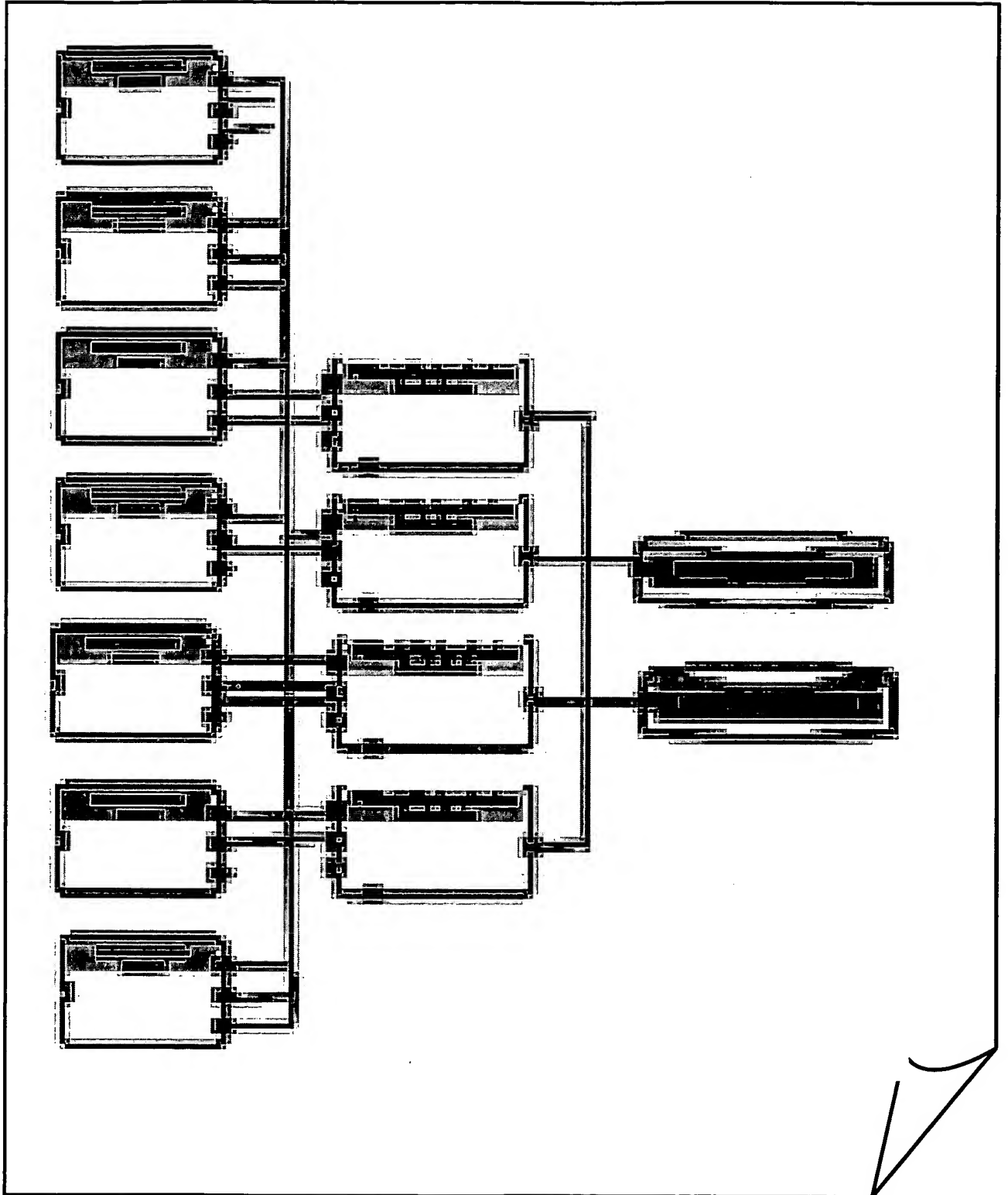


Fig. 25

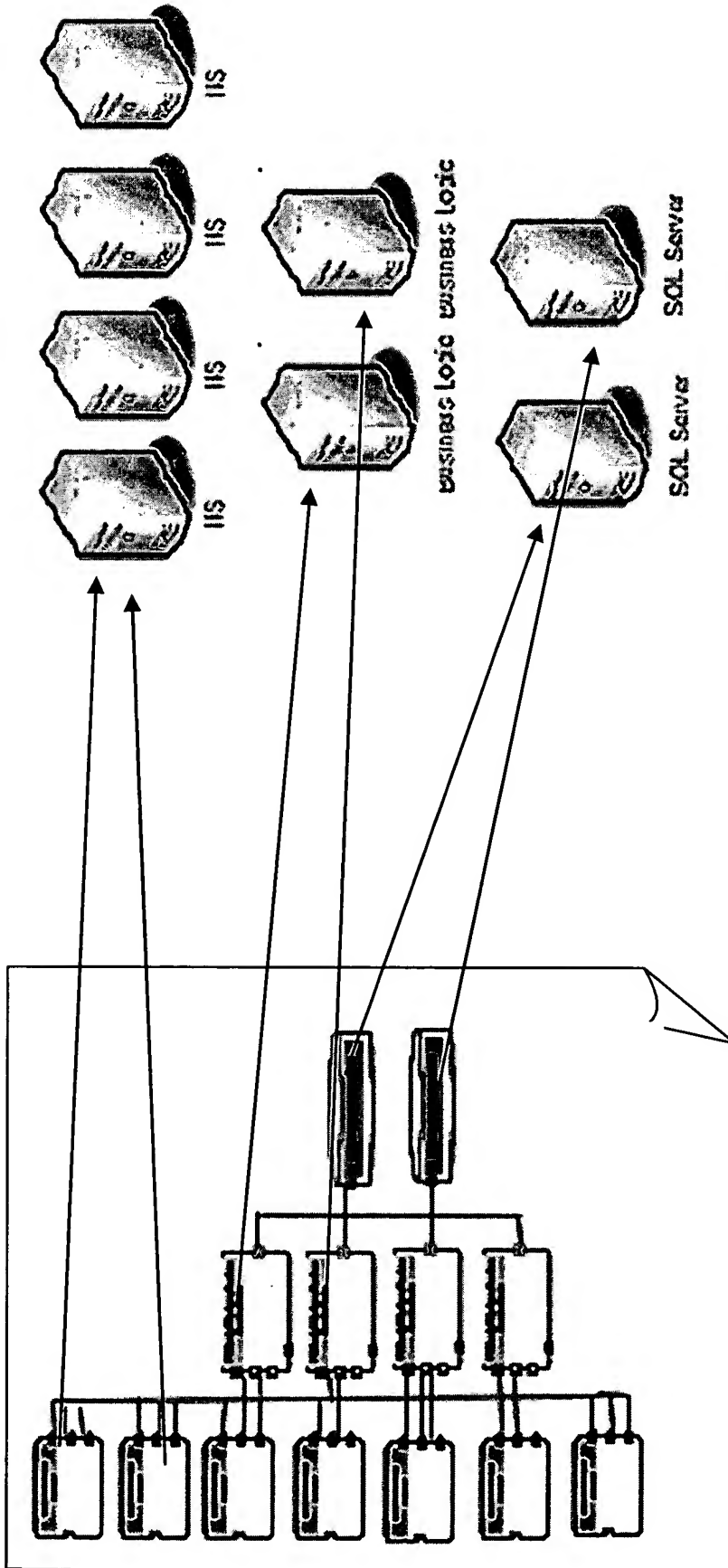
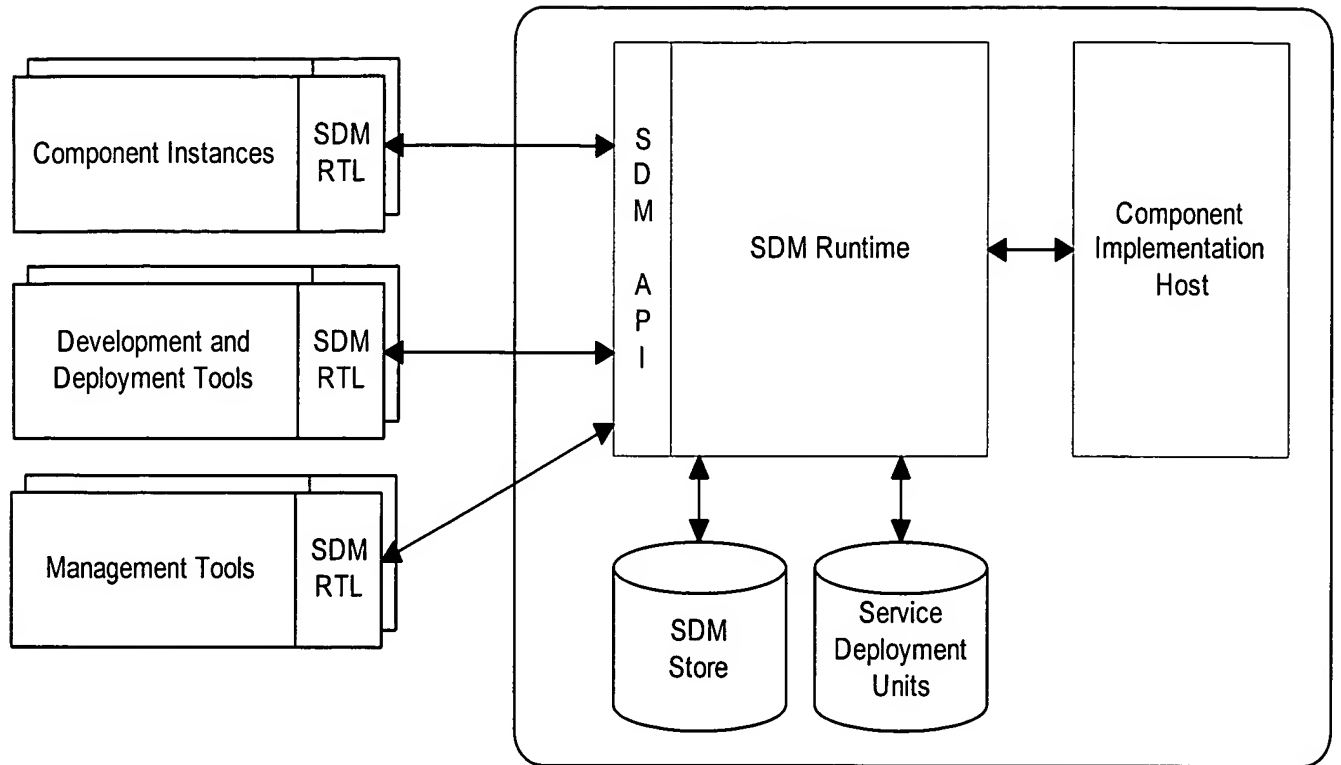
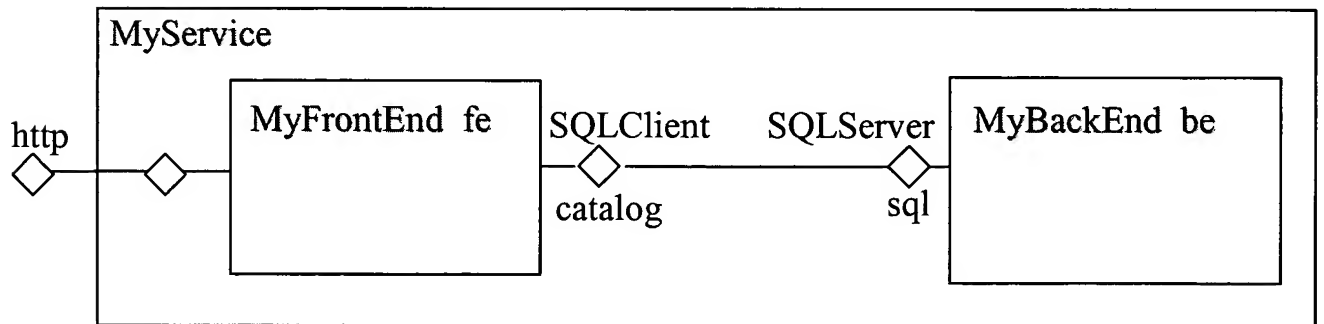
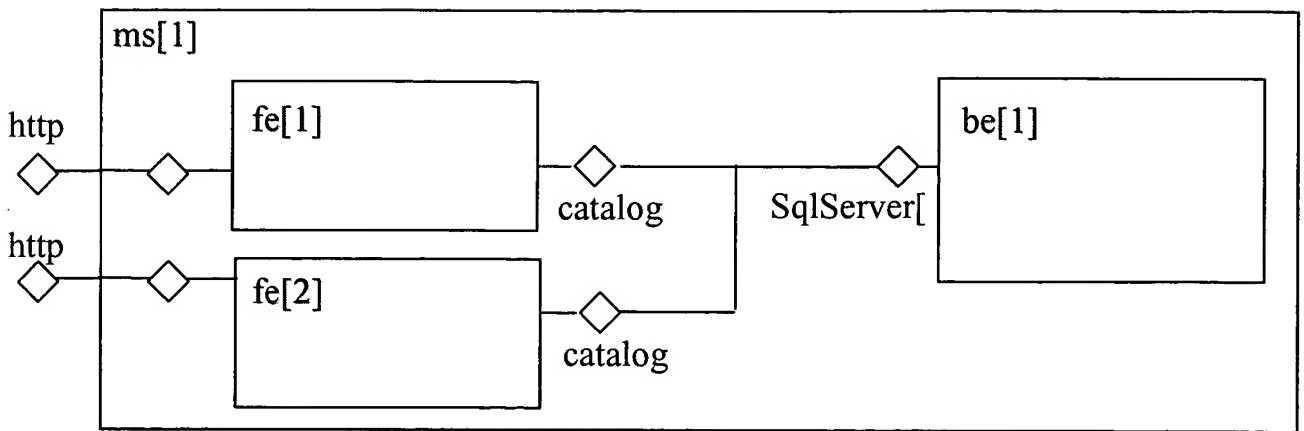
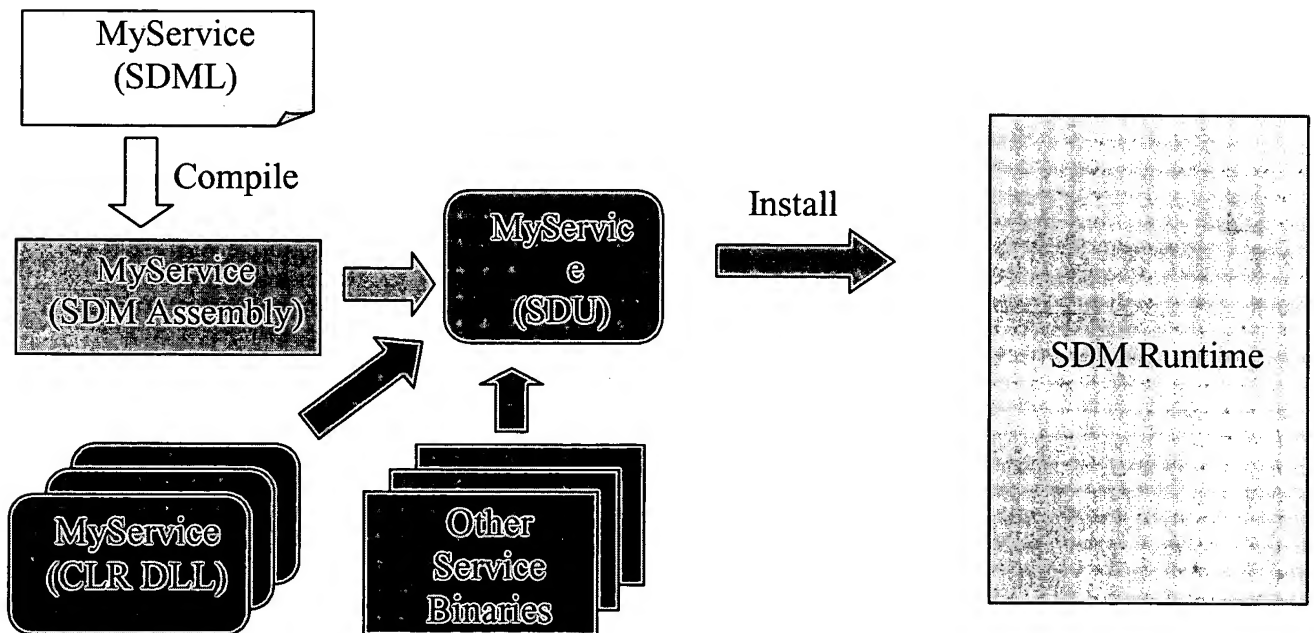


Fig. 26

*Fig. 27**Fig. 28*

*Fig. 29**Fig. 30*

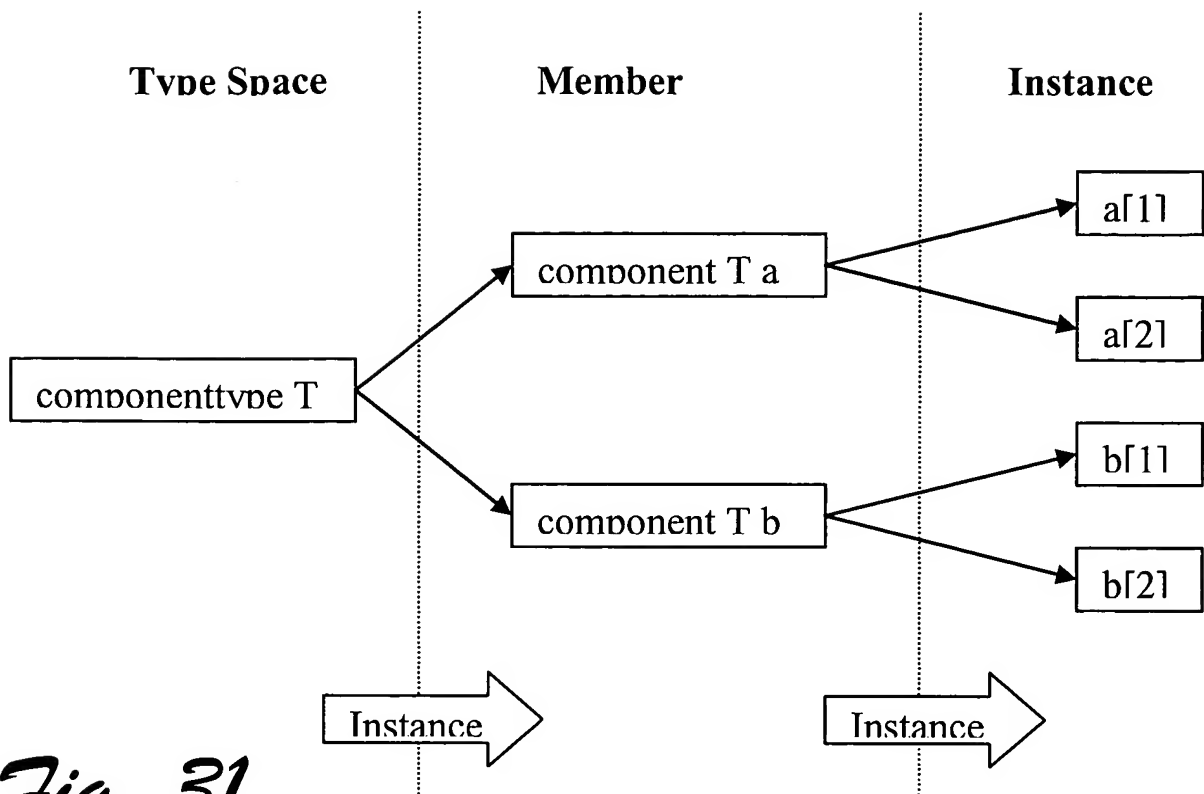
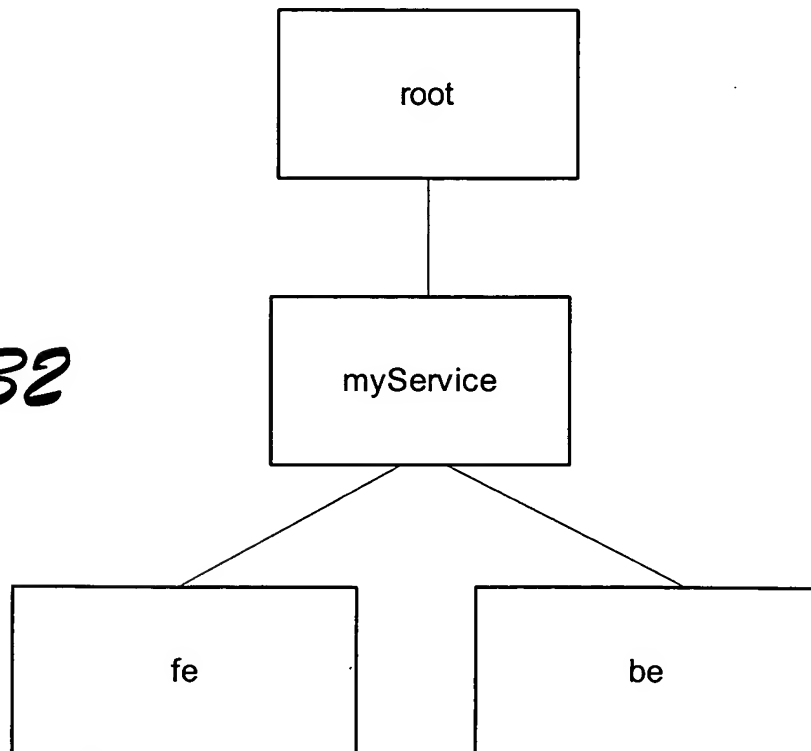
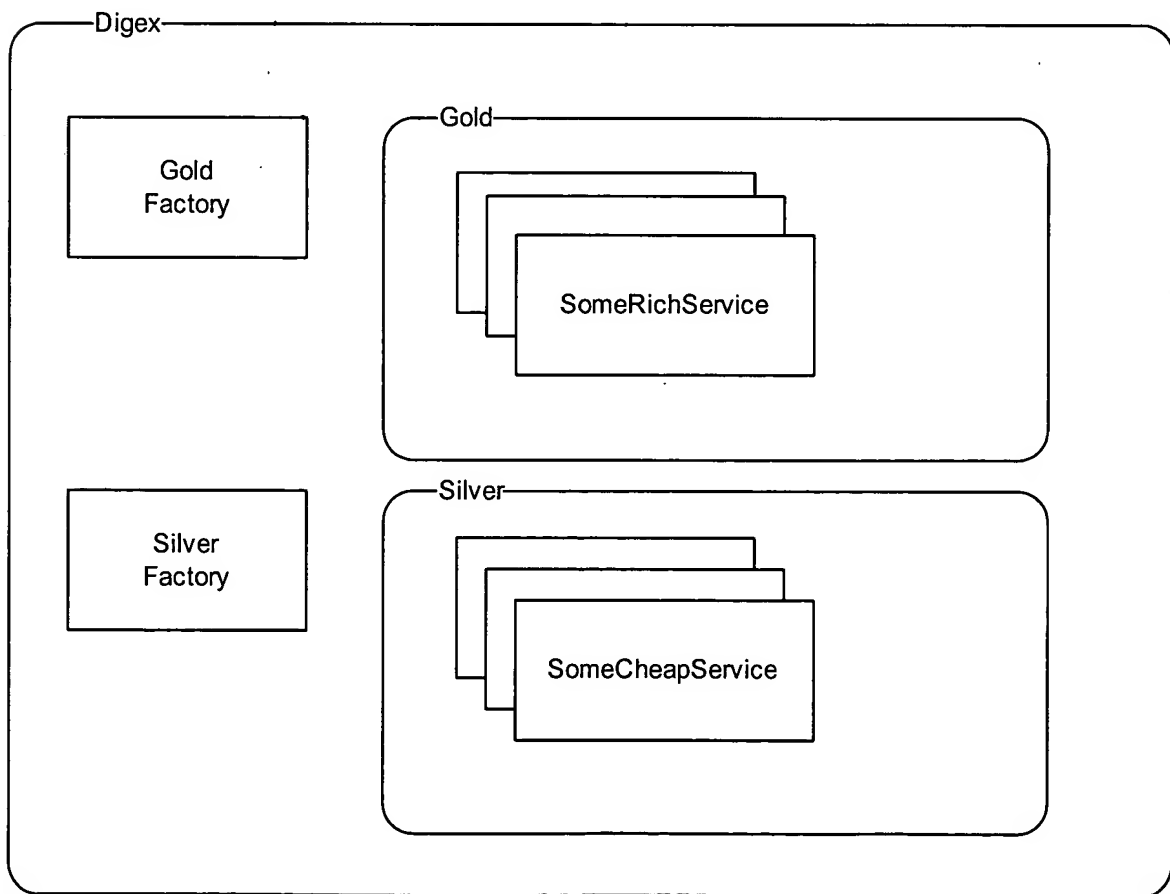
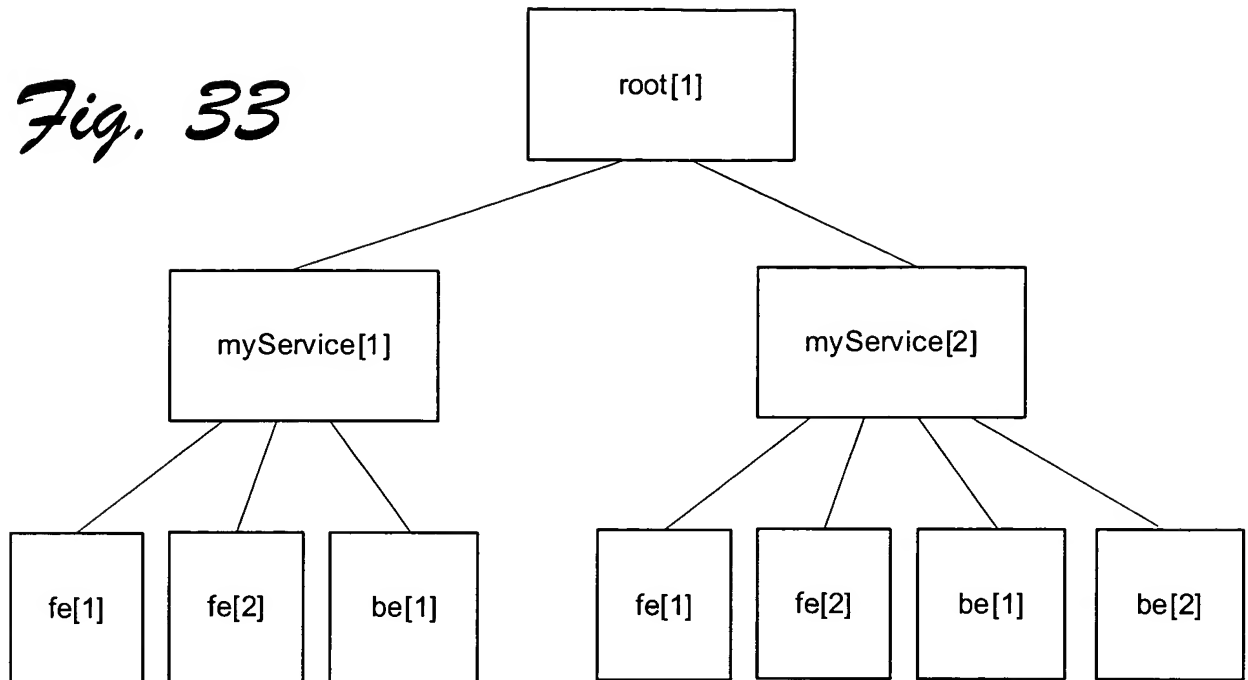
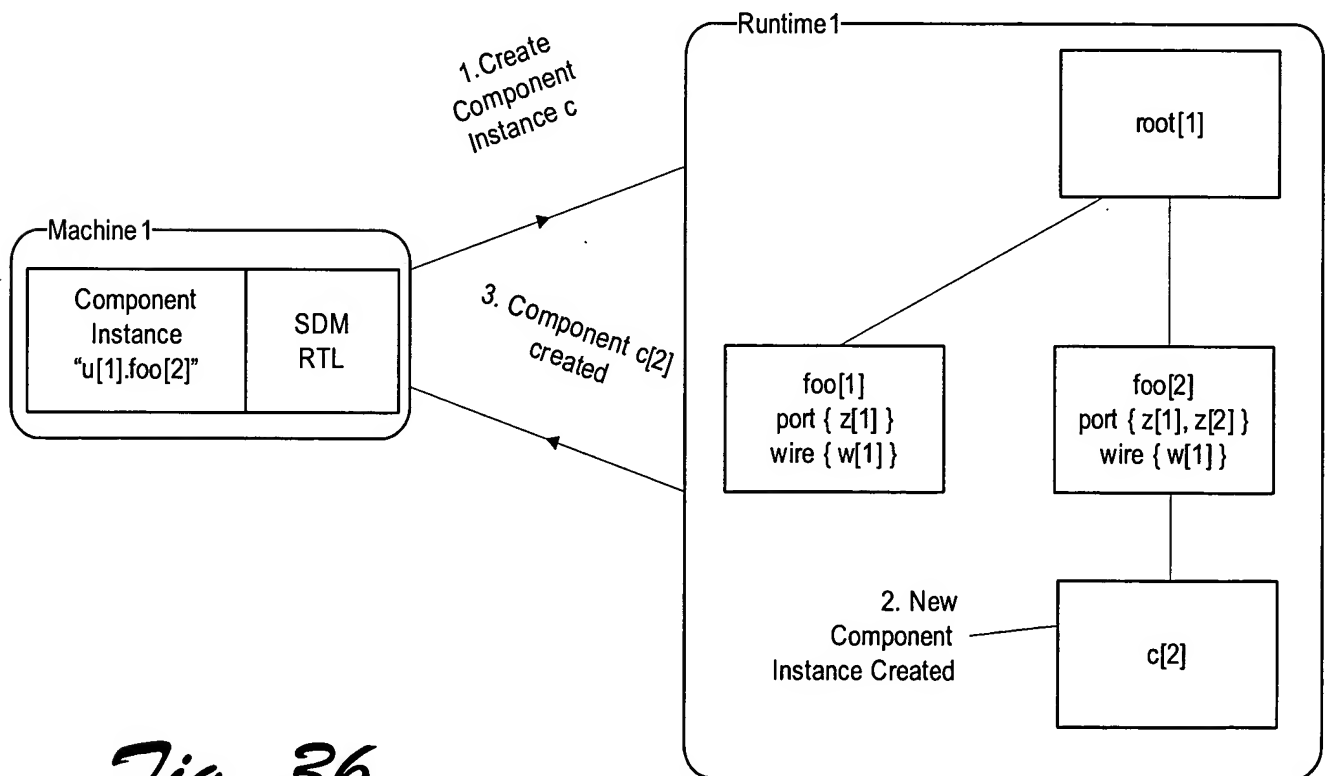
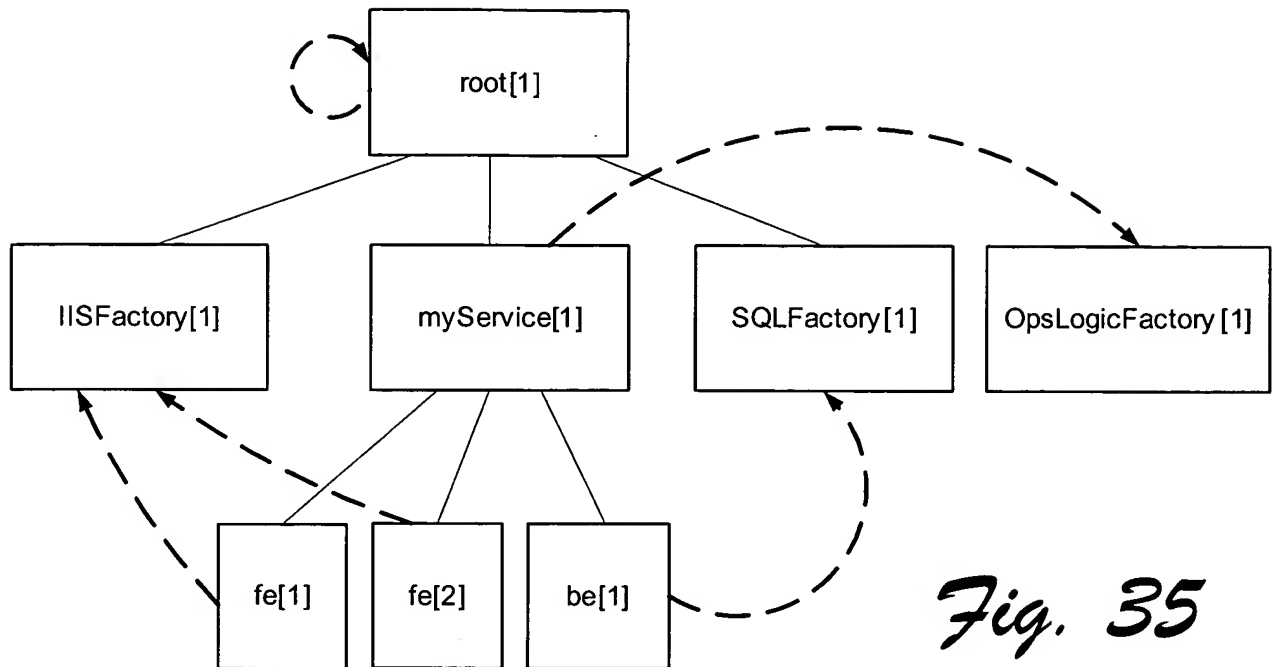
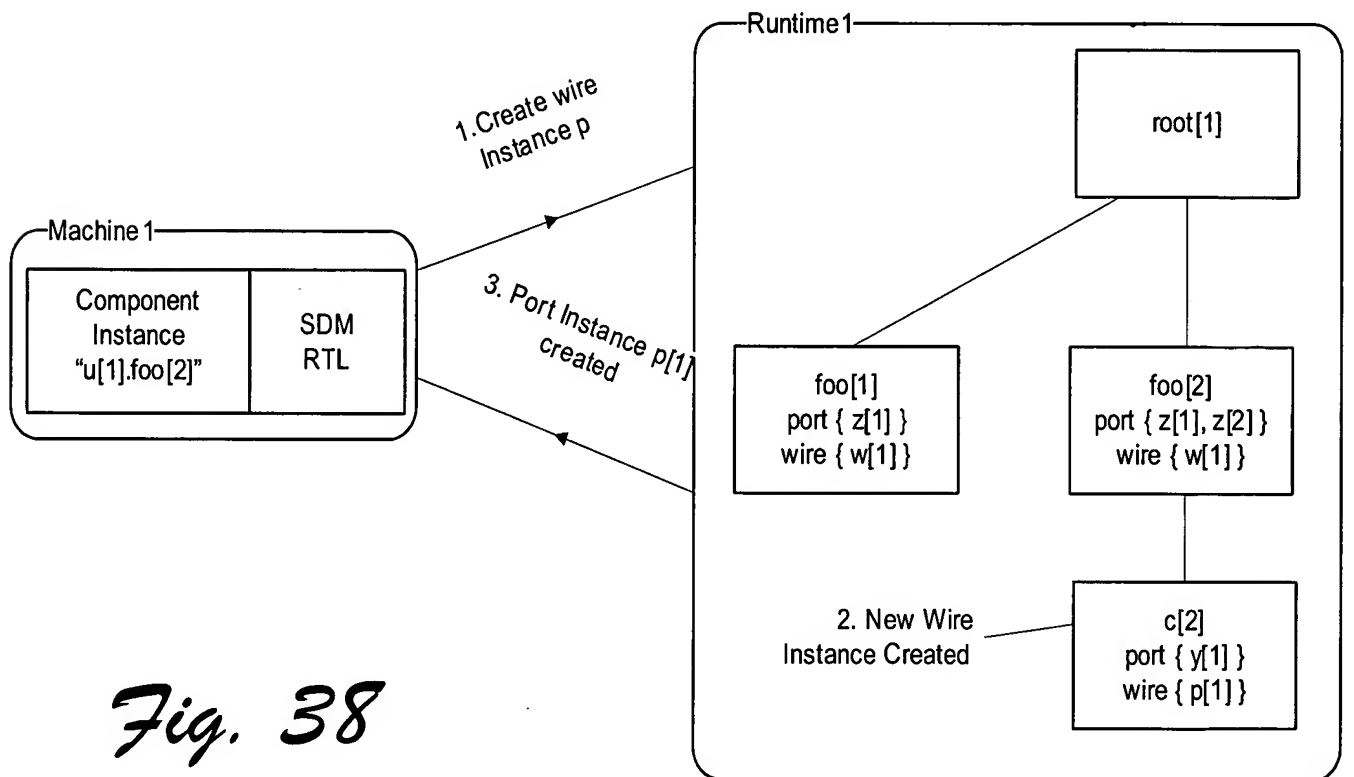
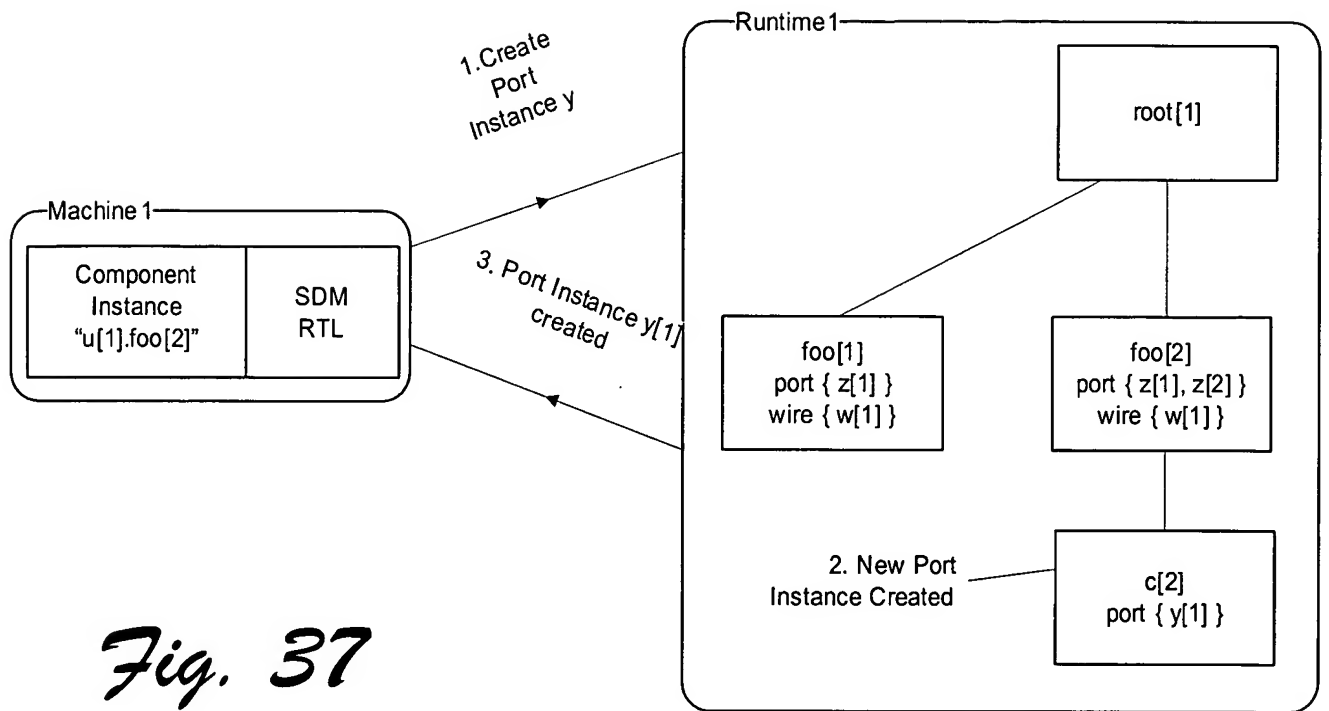
*Fig. 31**Fig. 32*

Fig. 33*Fig. 34*





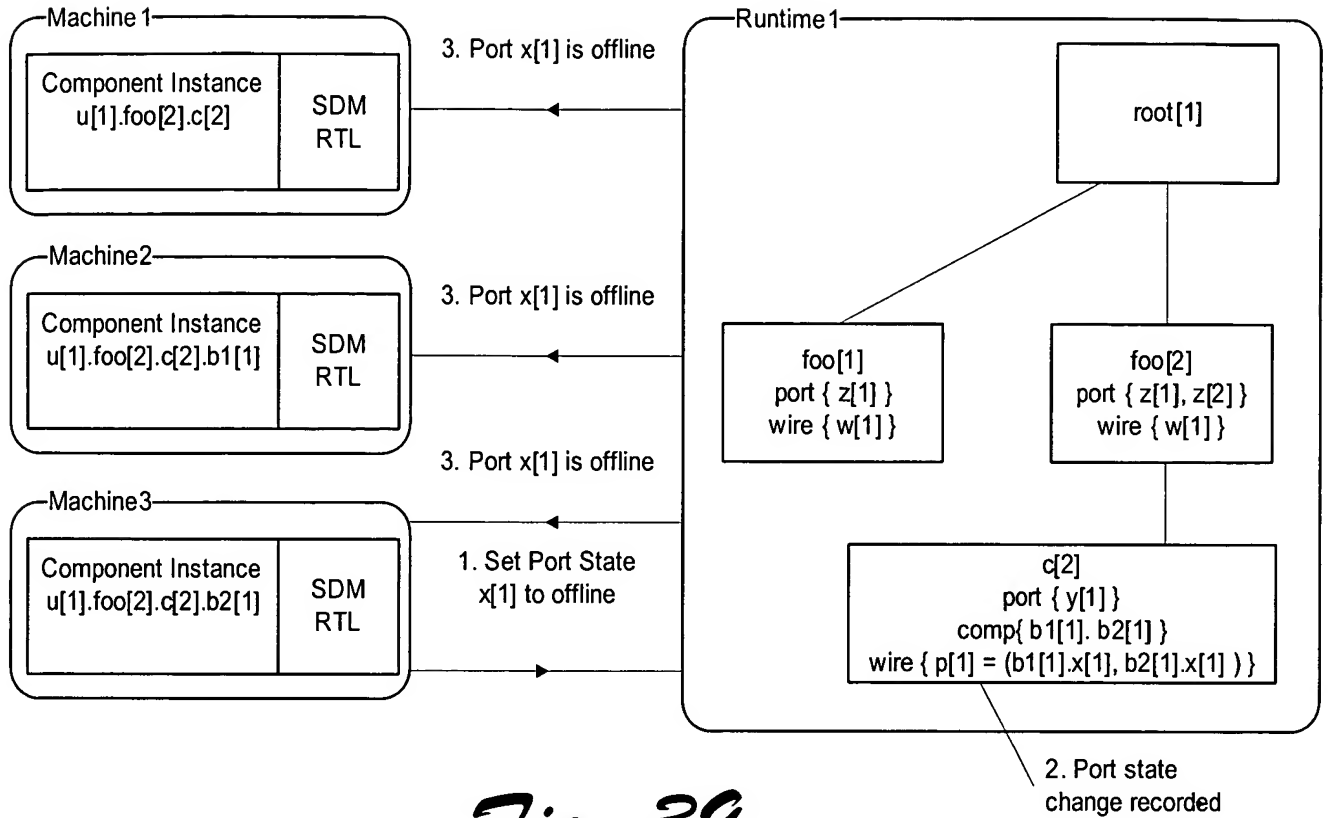


Fig. 39

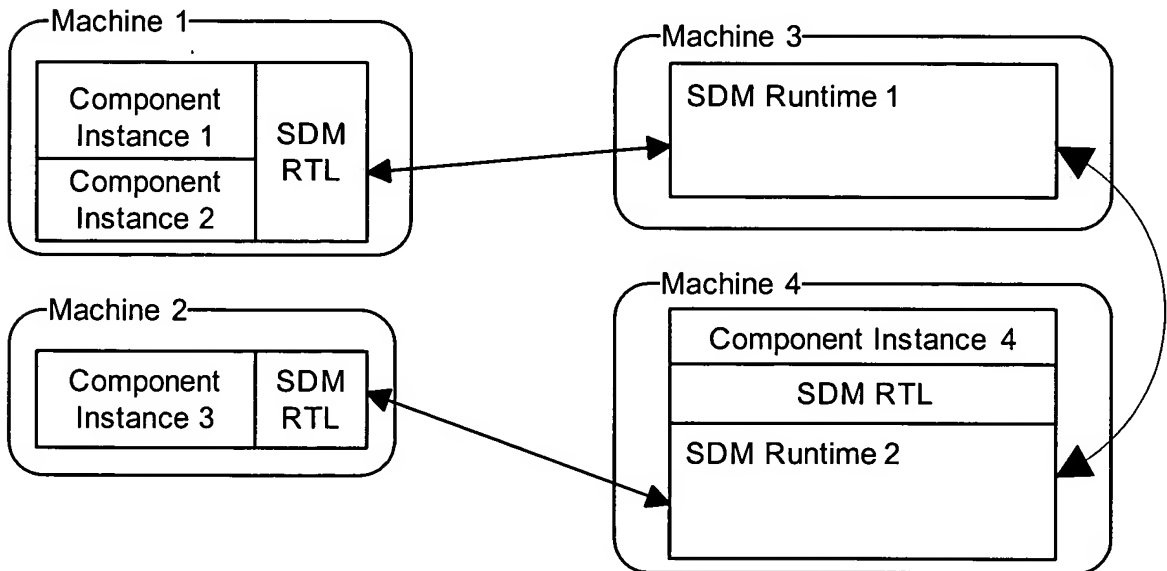
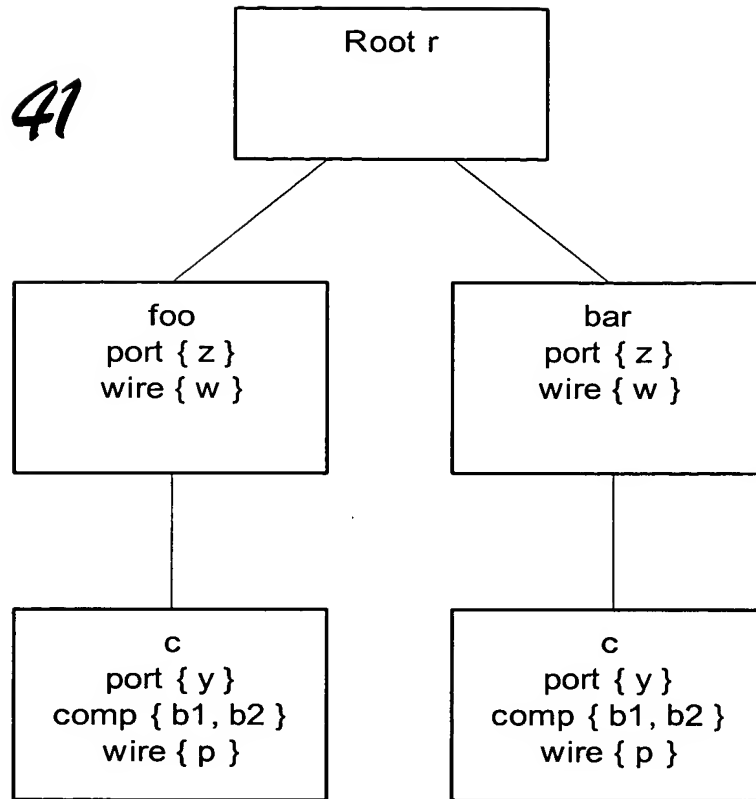
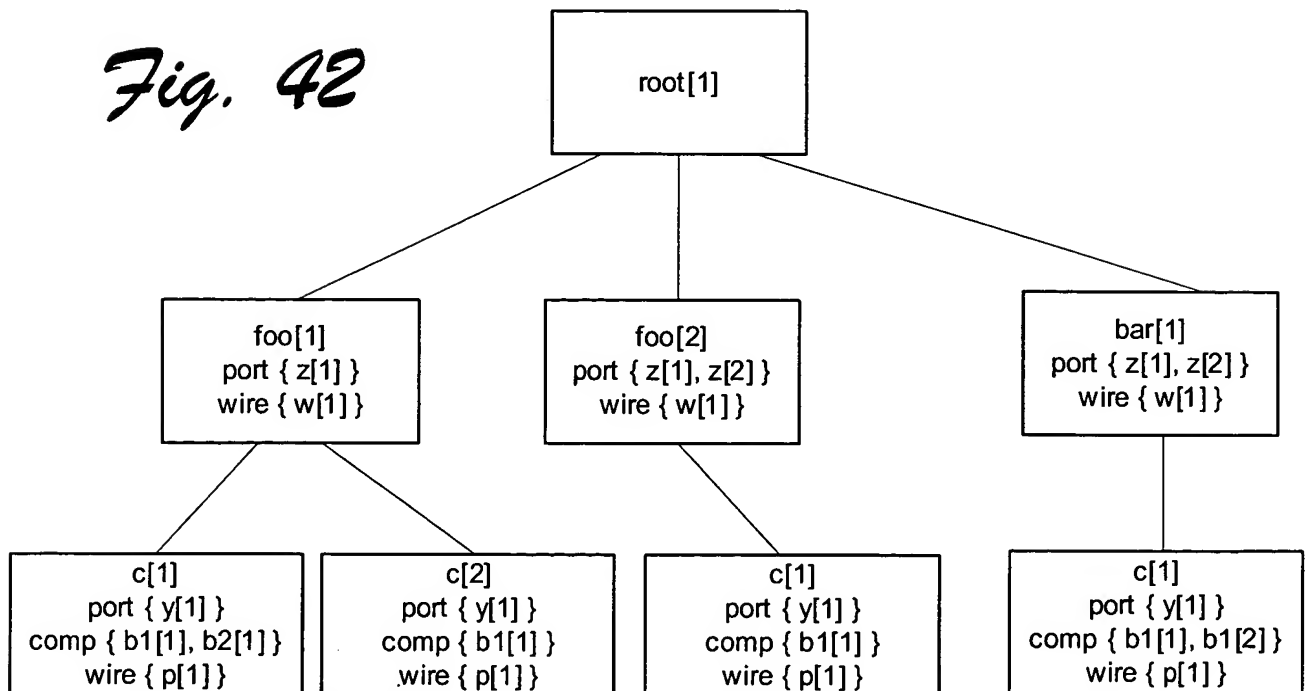
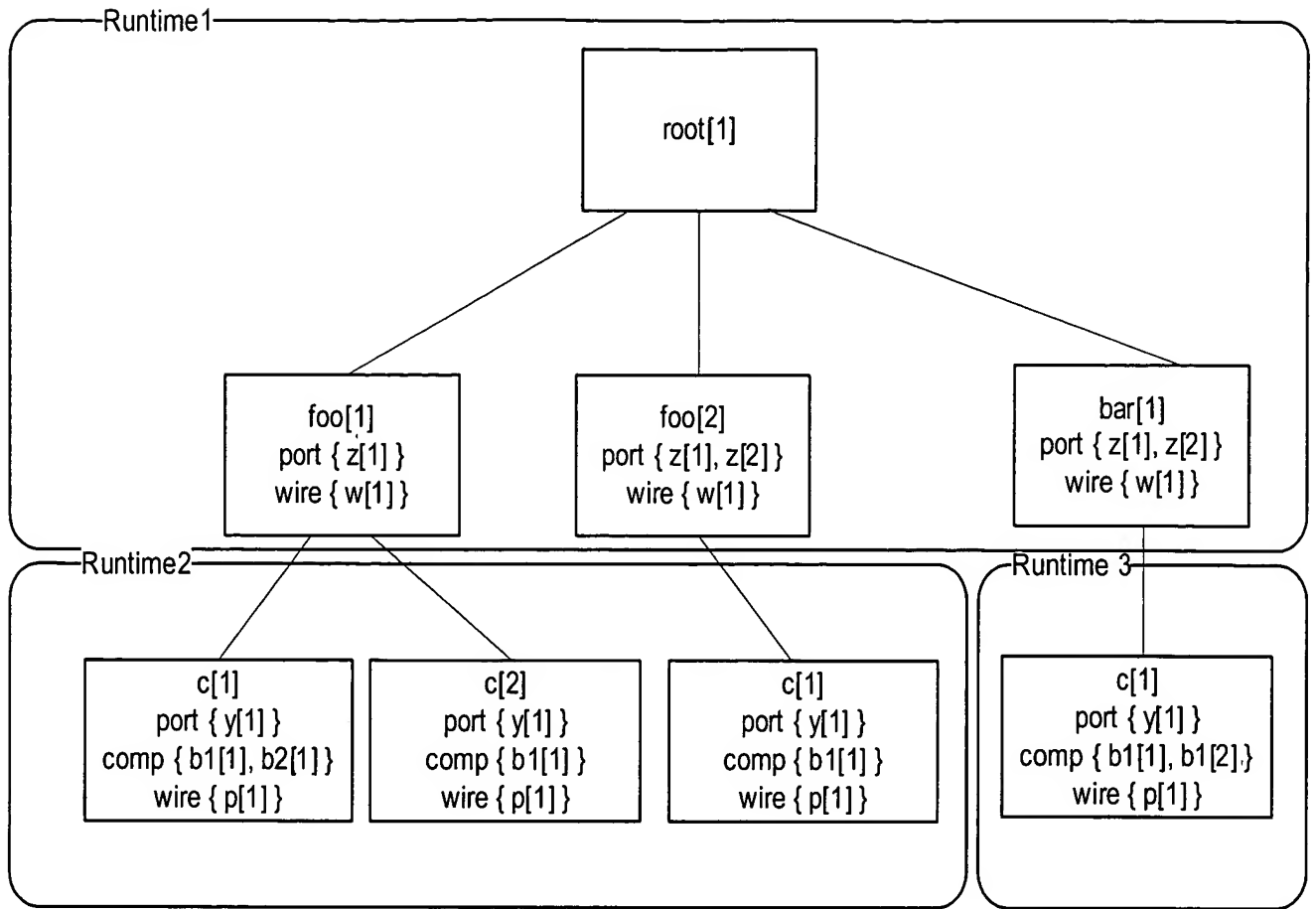
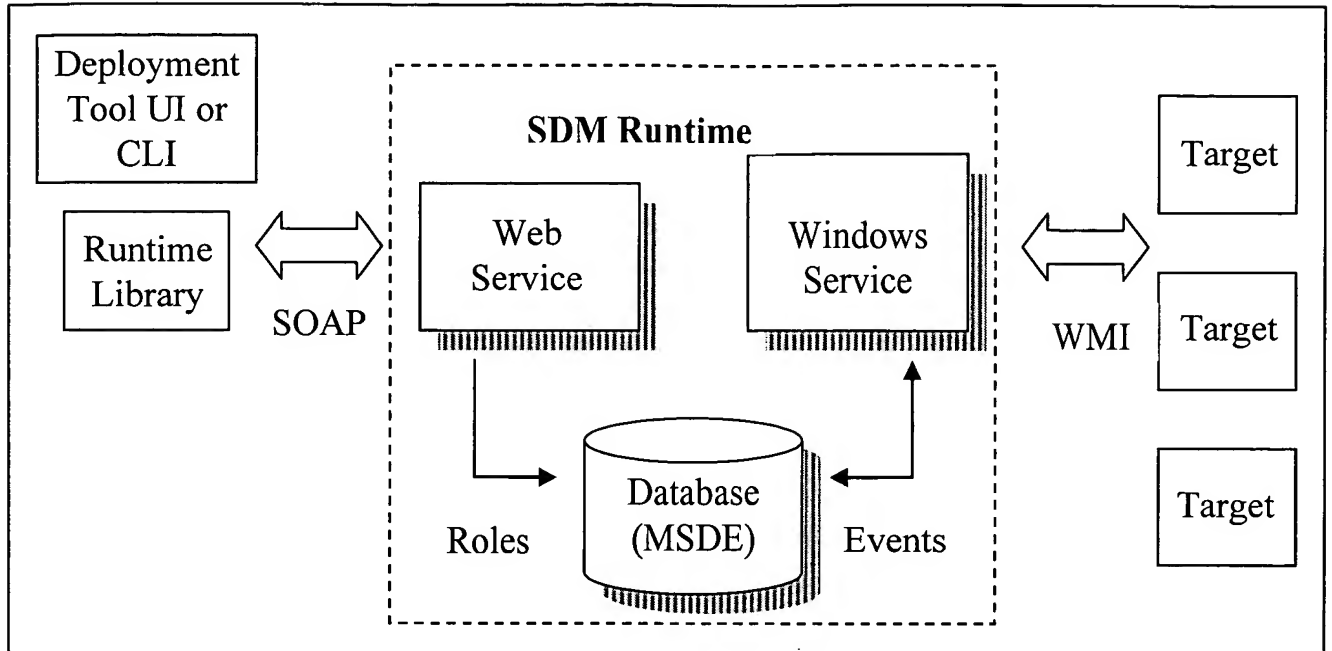
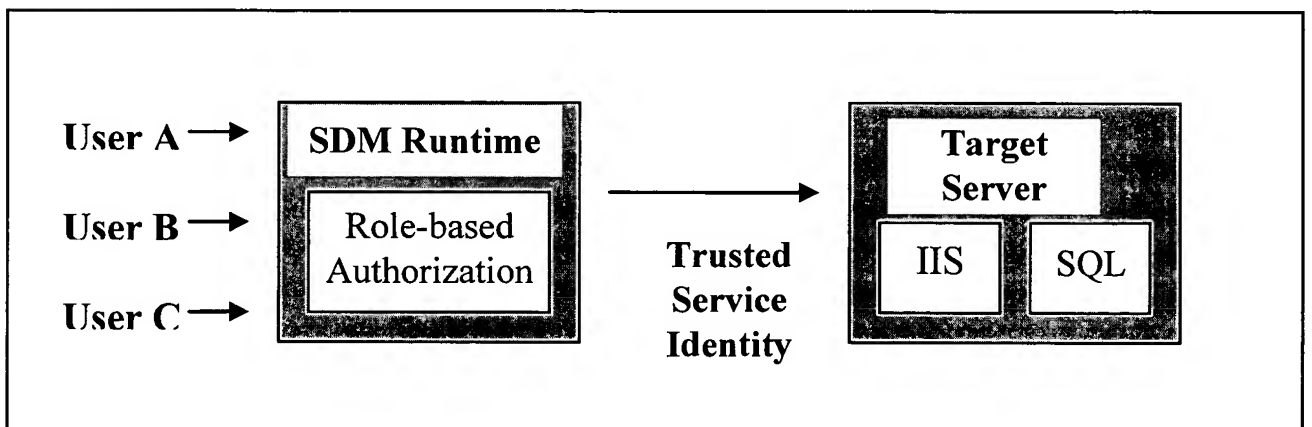
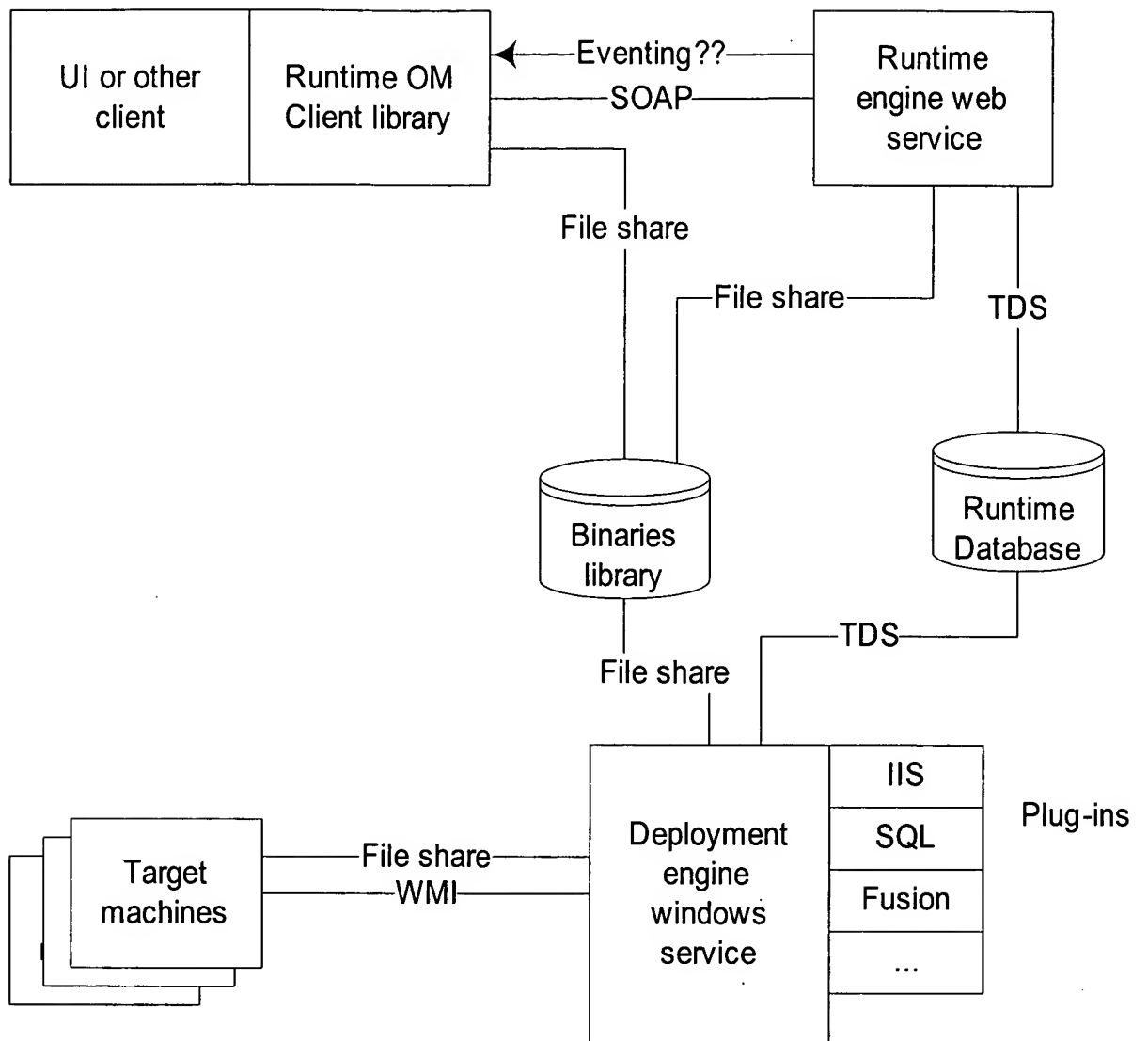


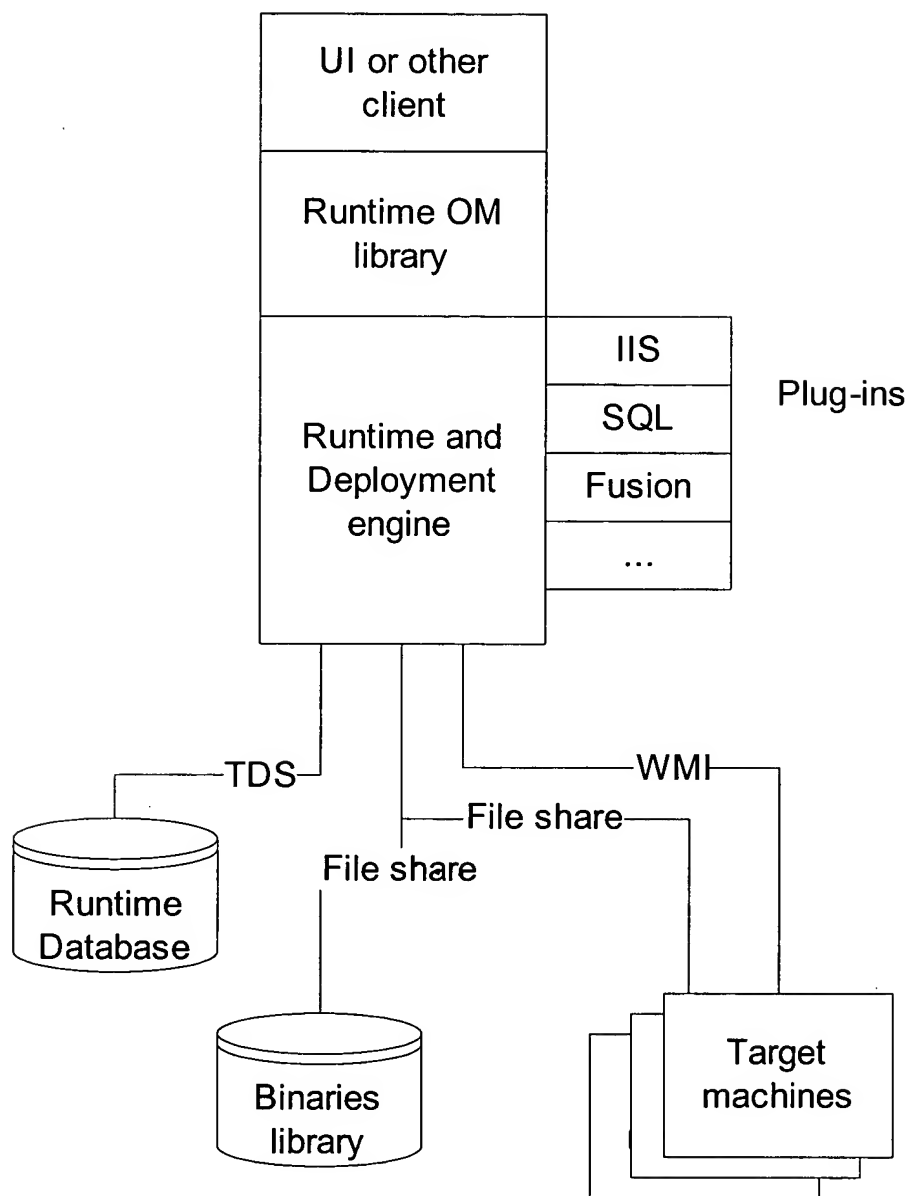
Fig. 40

Fig. 41*Fig. 42*

*Fig. 43*

*Fig. 44**Fig. 45*

*Fig. 46*

*Fig. 47*

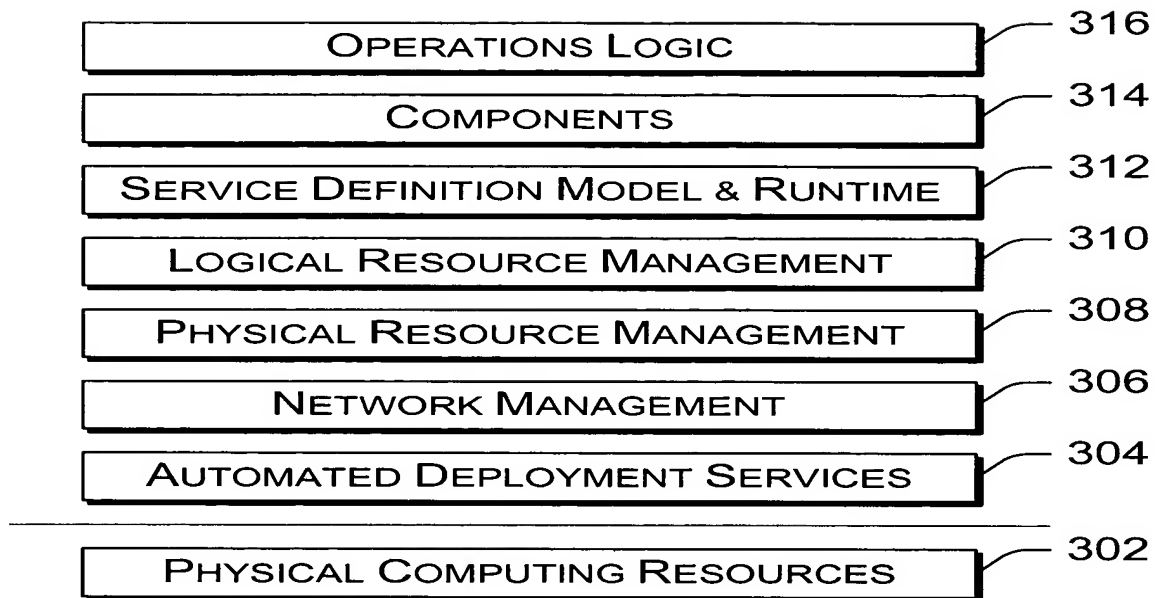


Fig. 48

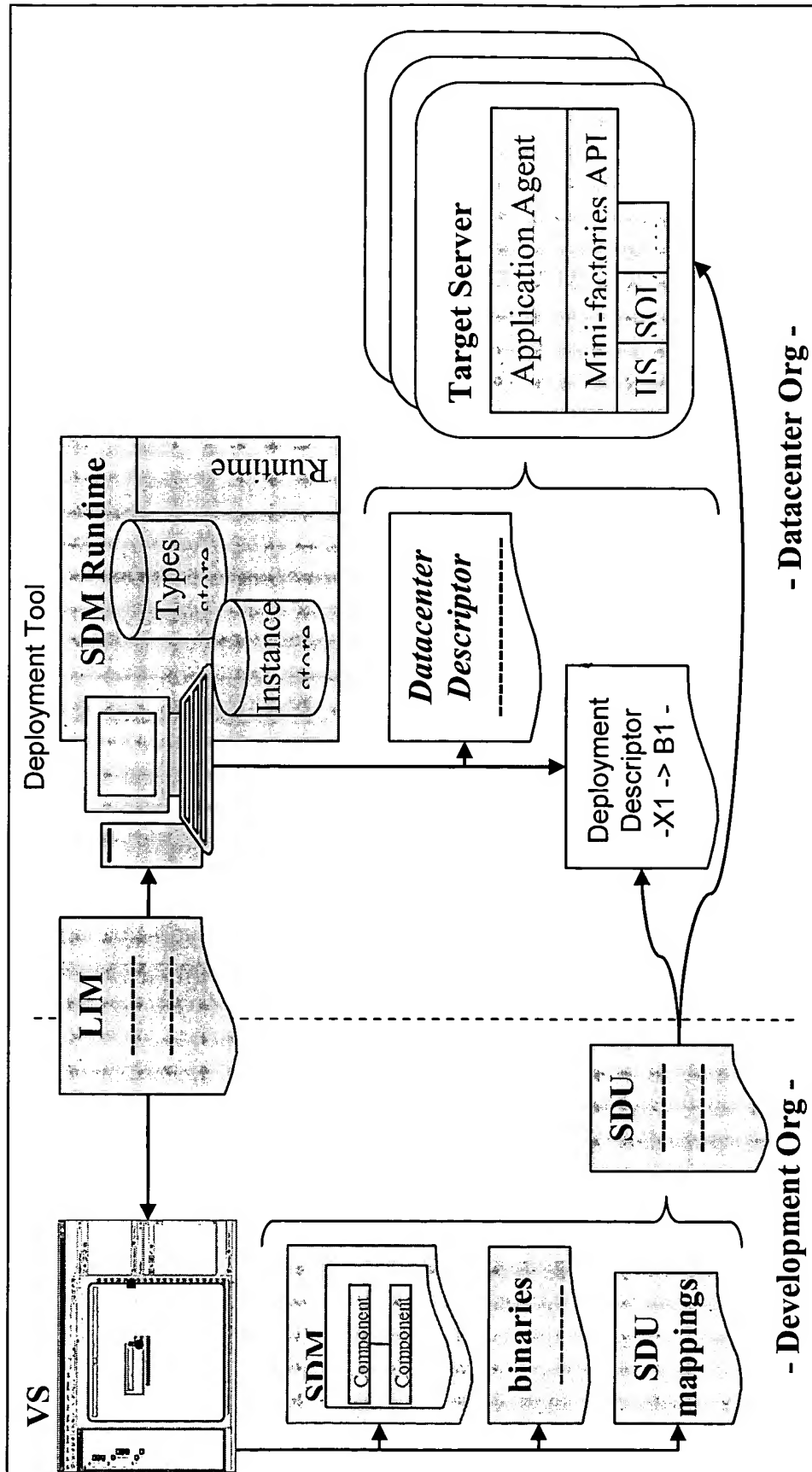


Fig. 49

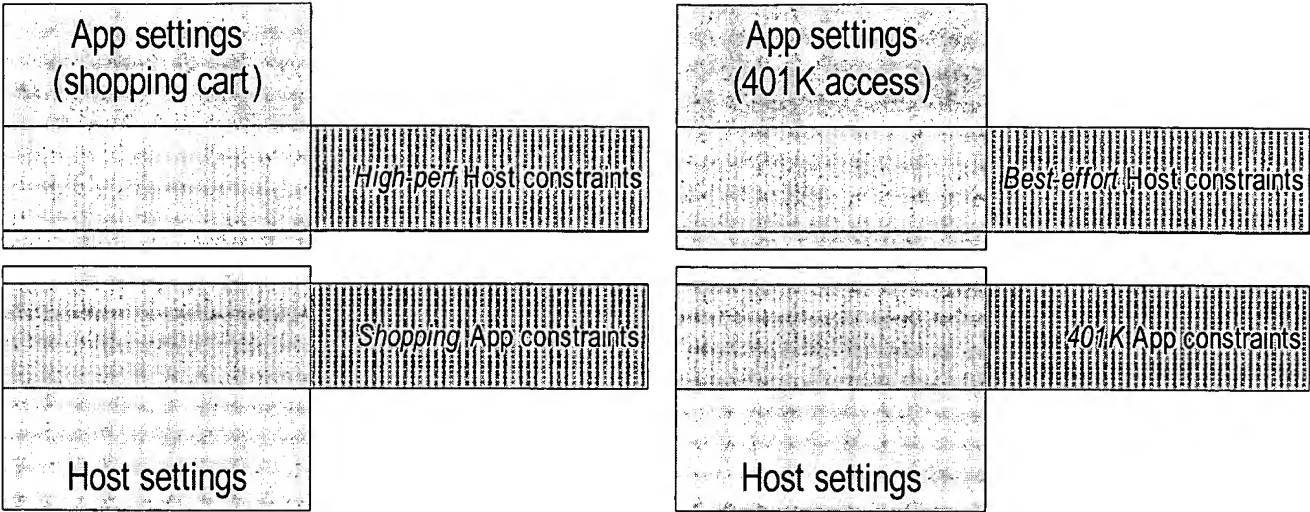
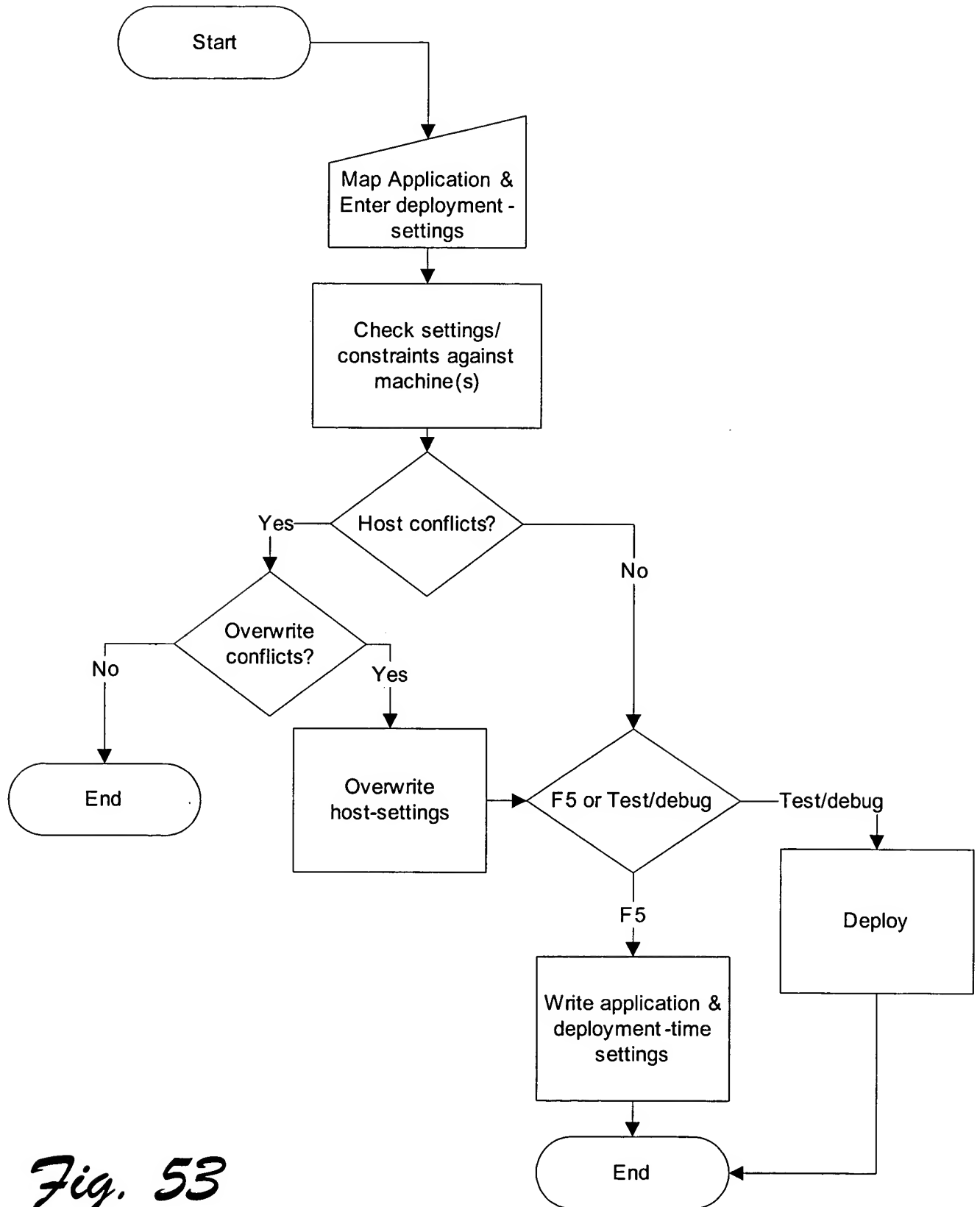
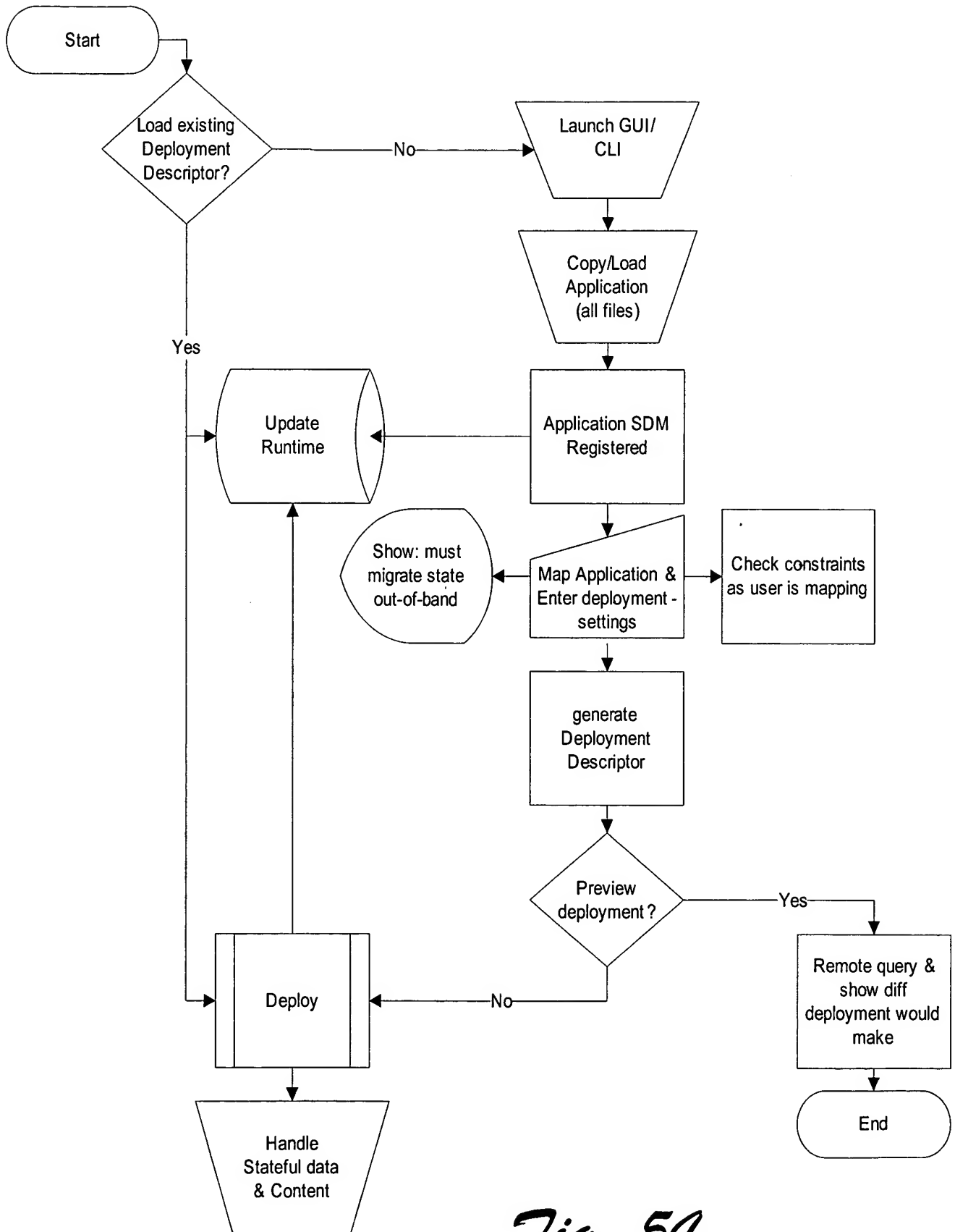


Fig. 50

Initial Phase	App Development Phase	Install Phase	Running Phase
Synch datacenter & LIM	Code/Test versus LIM	Install Application	Scale-out Topology-

Fig. 51

*Fig. 53*

*Fig. 54*

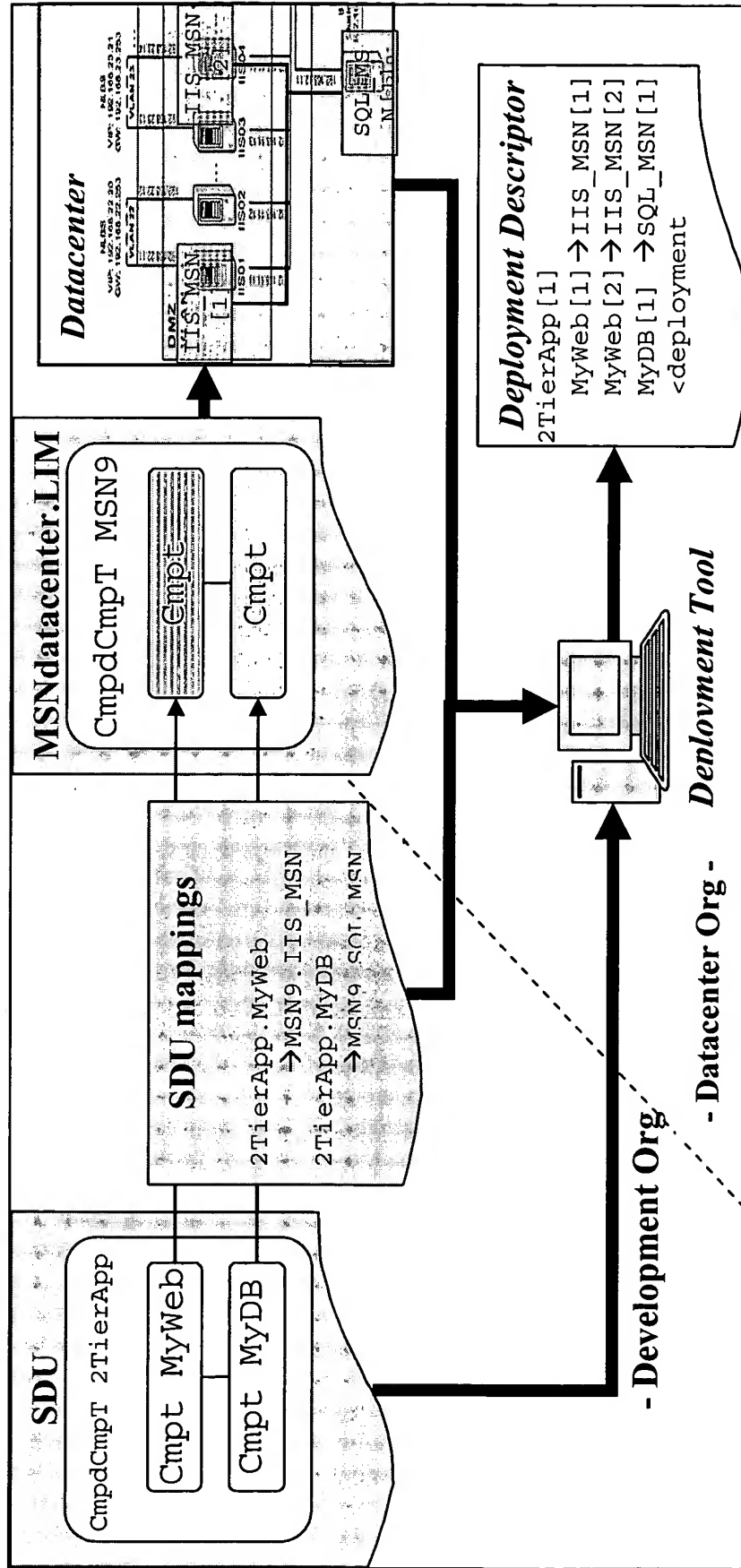
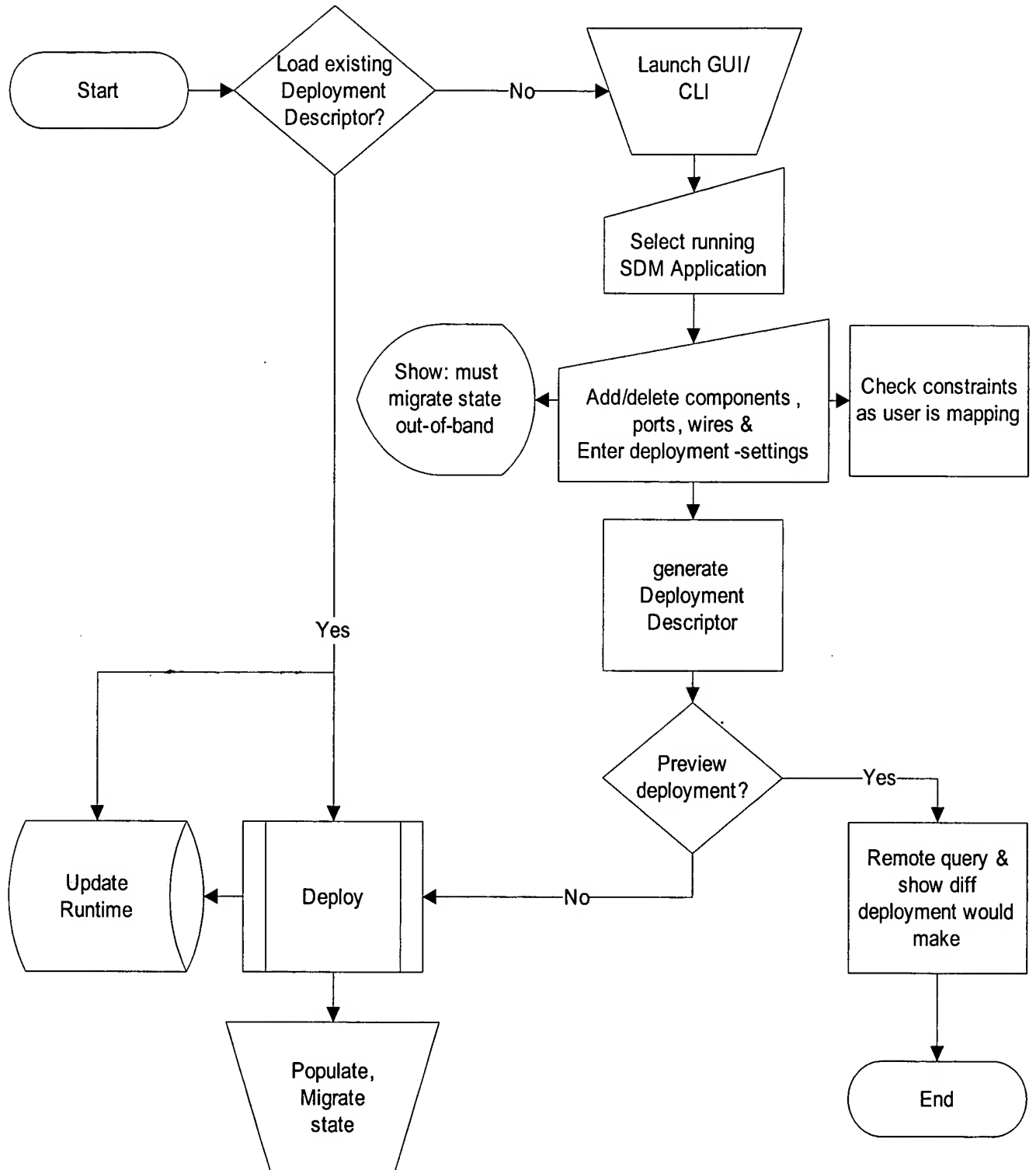
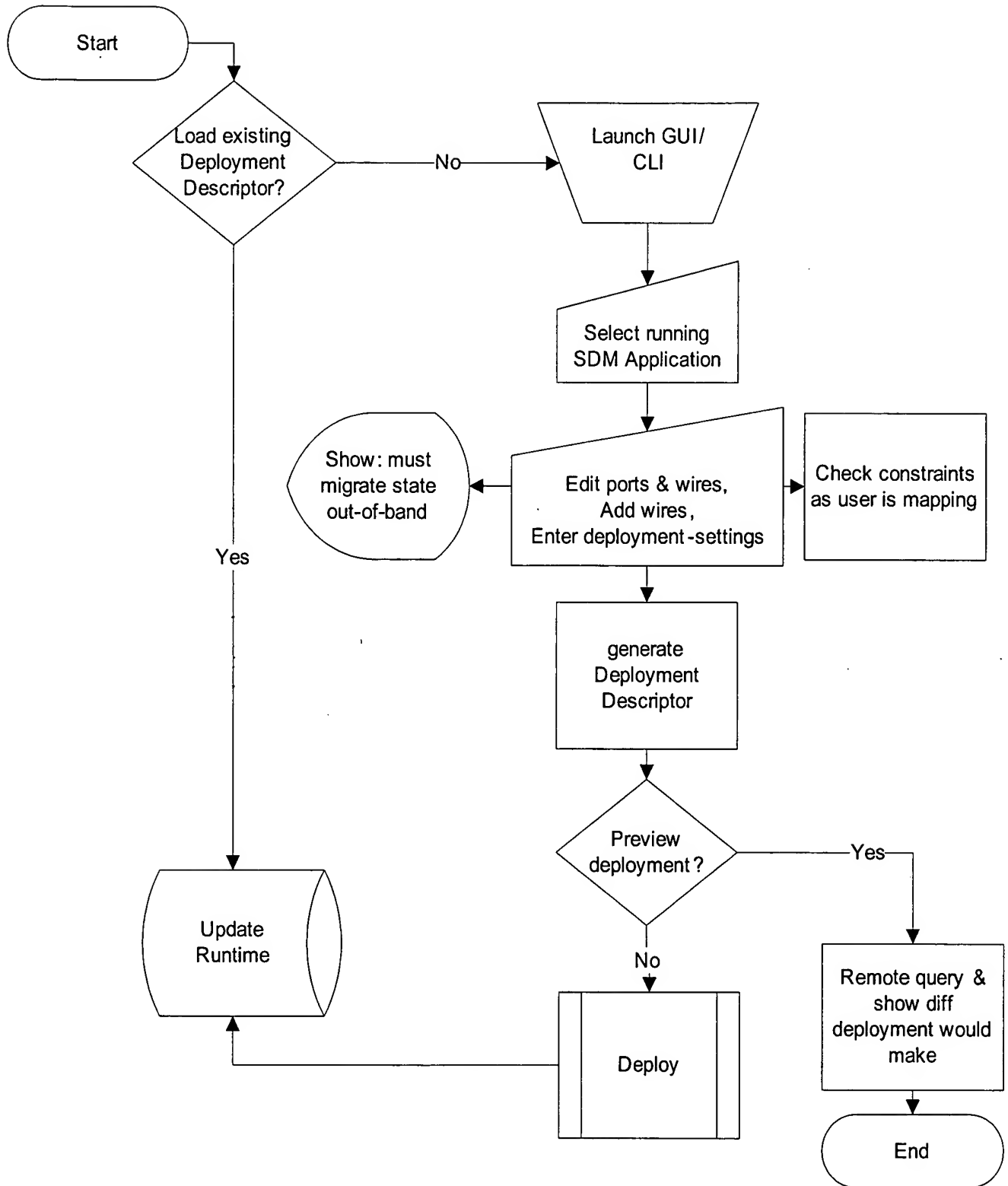
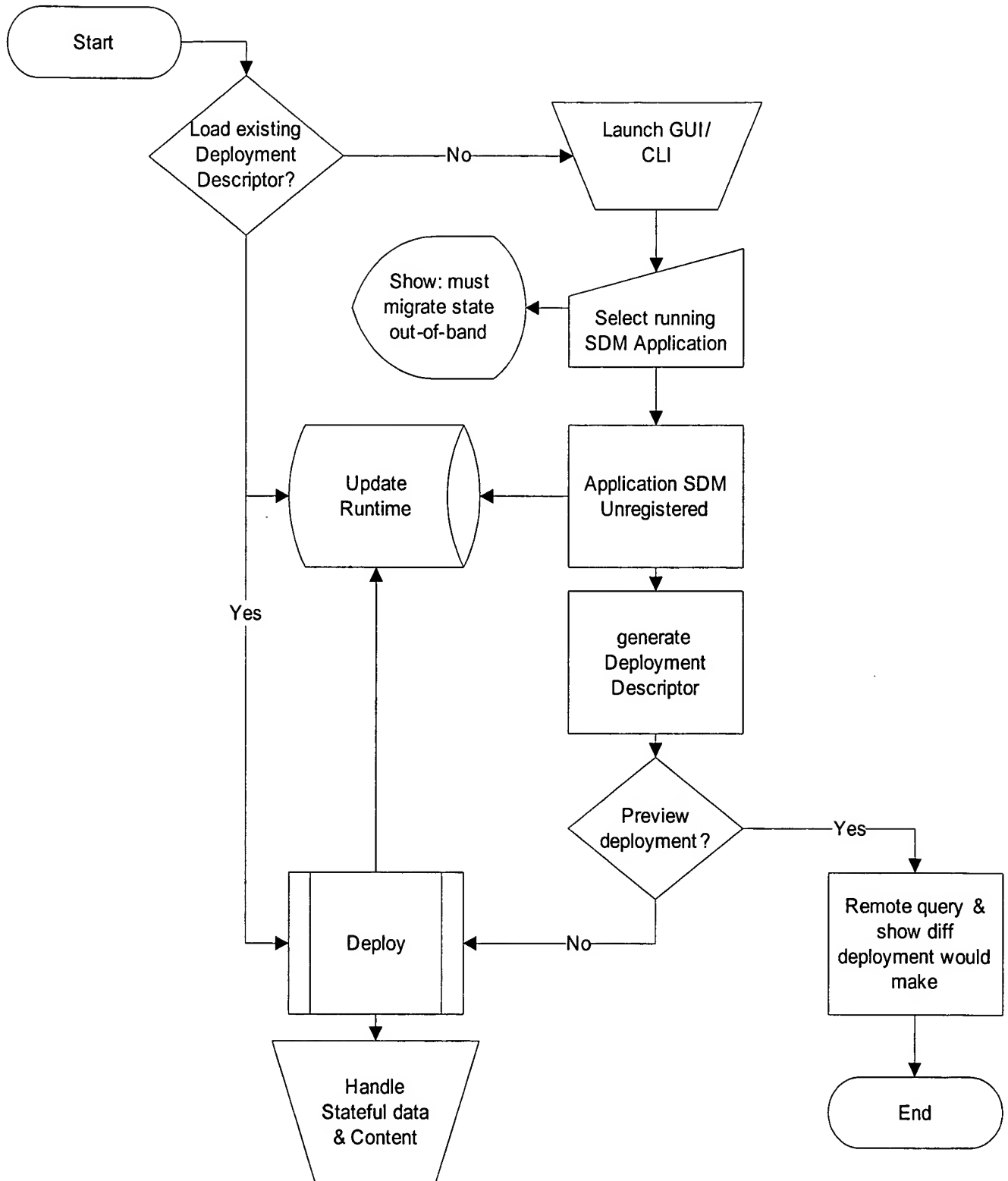


Fig. 55

*Fig. 56*

*Fig. 57*

*Fig. 58*

Model-Based Management: Closer Look

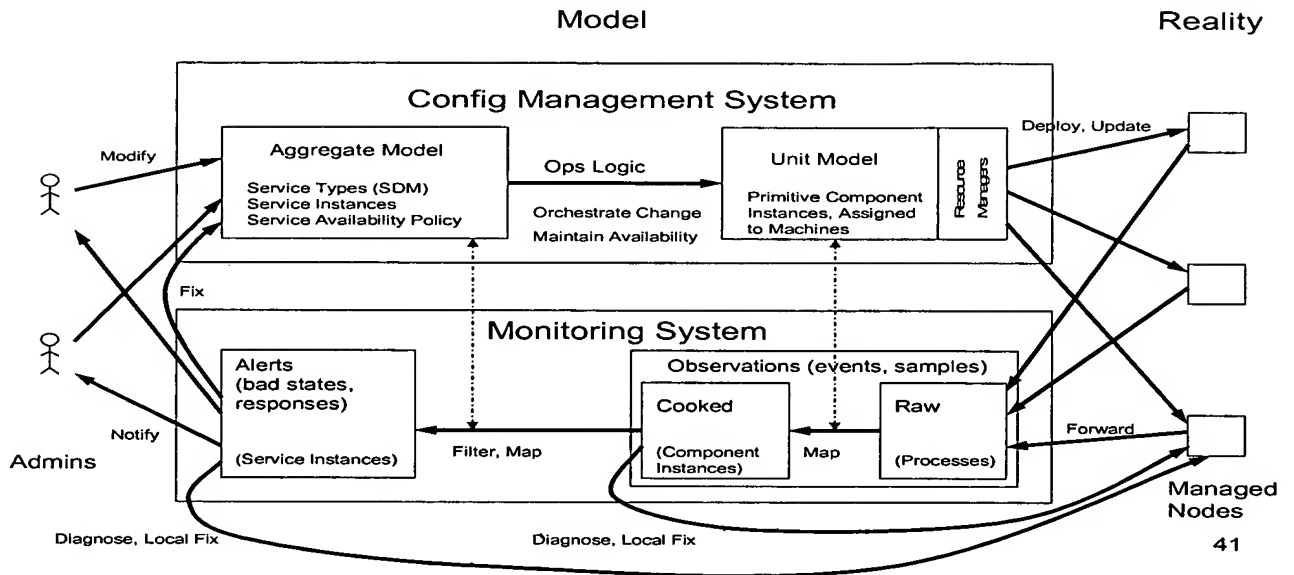


Fig. 59

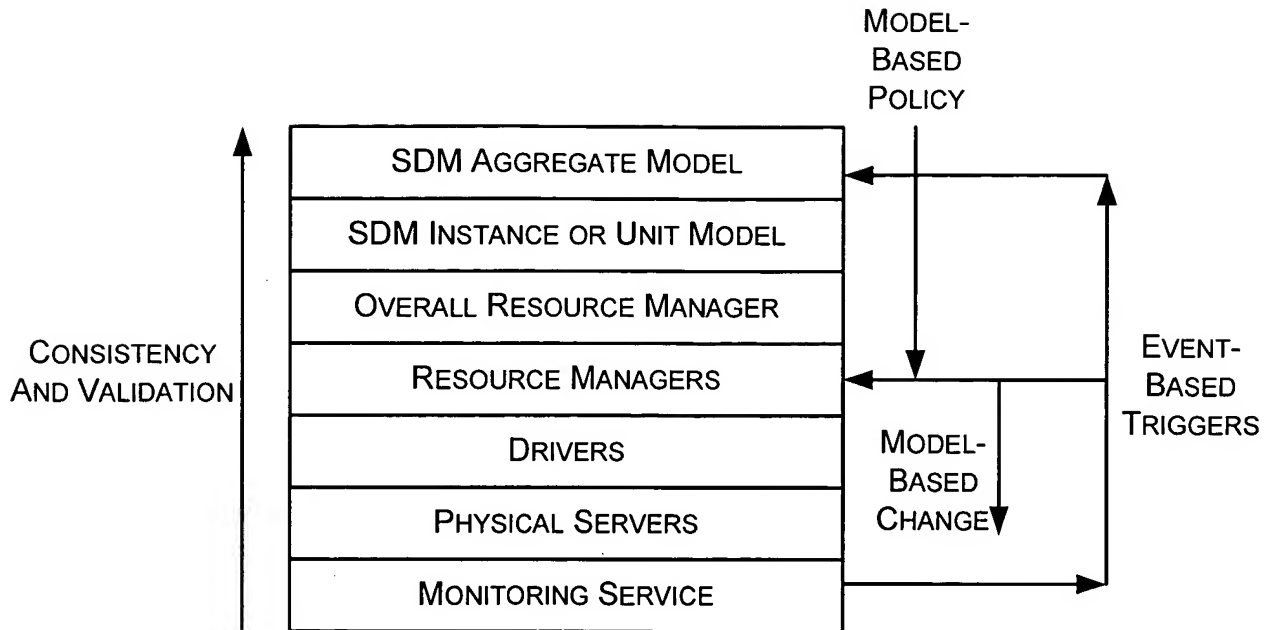
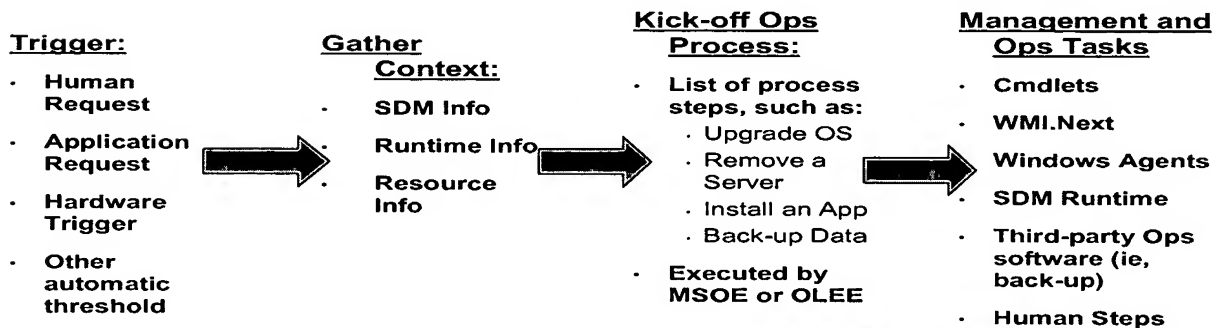


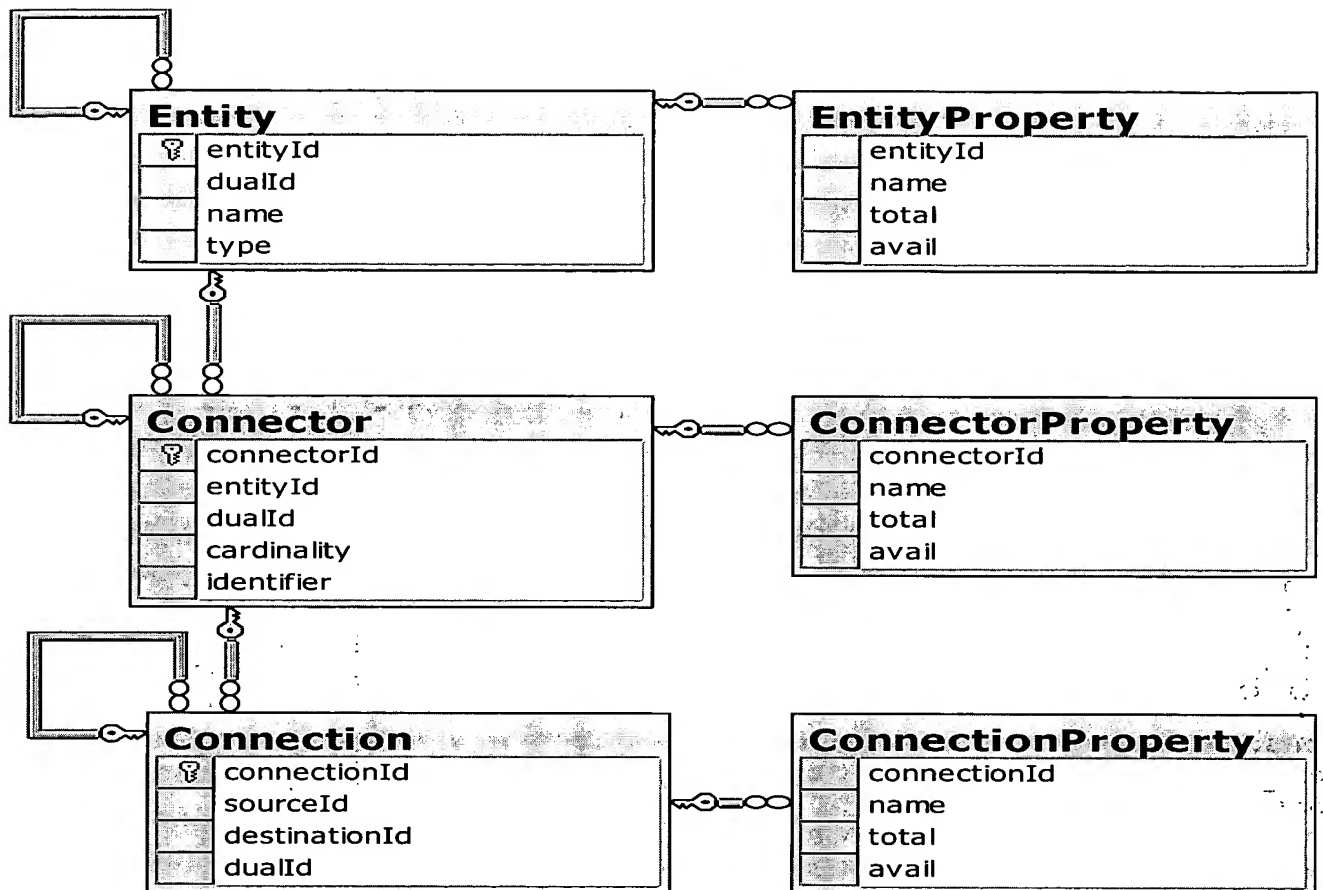
Fig. 60



Note: Console undefined, but needed for a user to:

- Enter and display trigger
- Confirm and monitor tasks
- Review task status and reporting

Fig. 61

*Fig. 62*

Room 42/4814,
Power Grid 4800

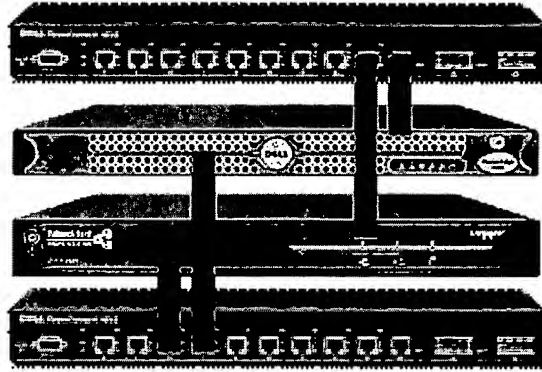


Fig. 63

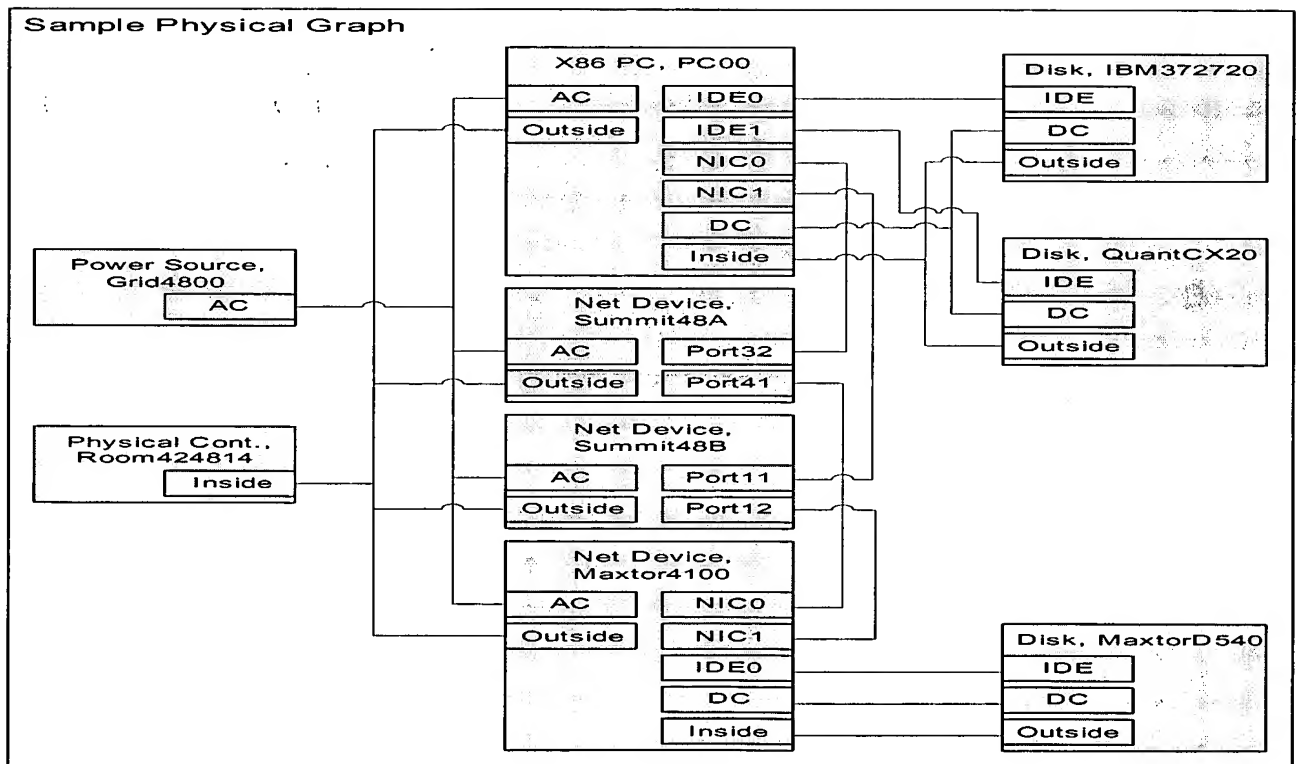


Fig. 64

ID	Src	Dst	Dual	Category	Name	Driver Identifier	Unique Identifier	Cardir	Notes
1				Power Source	Grid4800				
2				Physical Container	Room424814				
3				X86 PC	PC00				
4				Disk	IBM372720				
5				Disk	QuantCX20				
6			7	Network Device	Summit48A				
7			6	Network Device	Summit48B				
8				Network Device	Maxtor4100				
9				Disk	MaxtorD540X				
10	1			Power	AC Outlets				
11	2			Physical	Inside				
12	3			ATA	IDE0			2	
13	3			ATA	IDE1			2	
14	3		15	Ethernet	NIC0		mac:00-B0-D0-20-3F-32	1	
15	3		14	Ethernet	NIC1		mac:00-A0-C9-A0-0B-06	1	
16	3			Power	DC Connector				
17	3			Power	AC Connector			1	
18	3			Physical	Outside				
19	3			Physical	Inside			3	
20	4			ATA	Port			1	
21	4			Power	DC Connector				
22	4			Physical	Outside				
23	5			ATA	Port			1	
24	5			Power	DC Connector				
25	5			Physical	Outside				
26	6		30	Ethernet	Port 32			1	
27	6		31	Ethernet	Port 41			1	
28	6			Power	AC Connector				
29	6			Physical	Outside				
30	7		26	Ethernet	Port 11			1	
31	7		27	Ethernet	Port 12			1	
32	7			Power	AC Connector				
33	7			Physical	Outside				
34	8		35	Ethernet	NIC0		mac:00-A0-29-FE-CA-20	1	
35	8		34	Ethernet	NIC1		mac:00-A0-29-FE-CA-21	1	
36	8			ATA	IDE0			2	
37	8			Power	DC Connector				
38	8			Power	AC Connector				
39	8			Physical	Outside				
40	8			Physical	Inside			3	
41	9			ATA	Port			1	
42	9			Power	DC Connector				
43	9			Physical	Outside				
44	26	14	45	Ethernet	Wire0				
45	30	15	44	Ethernet	Wire1				
46	10	17		Power	Cord0				
47	11	18		Physical	Contained				
48	12	20		ATA	Cable				
49	16	21		Power	DC Cable				
50	19	22		Physical	Internal				
51	13	23		ATA	Cable				
52	16	24		Power	DC Cable				
53	19	25		Physical	Internal				
54	27	34	55	Ethernet	Wire2				
55	31	35	54	Ethernet	Wire3				
56	10	38		Power	Cord0				
57	11	39		Physical	Contained				
58	36	41		ATA	Cable				
59	37	42		Power	Cable				
60	40	43		Physical	Internal				

Fig. 65

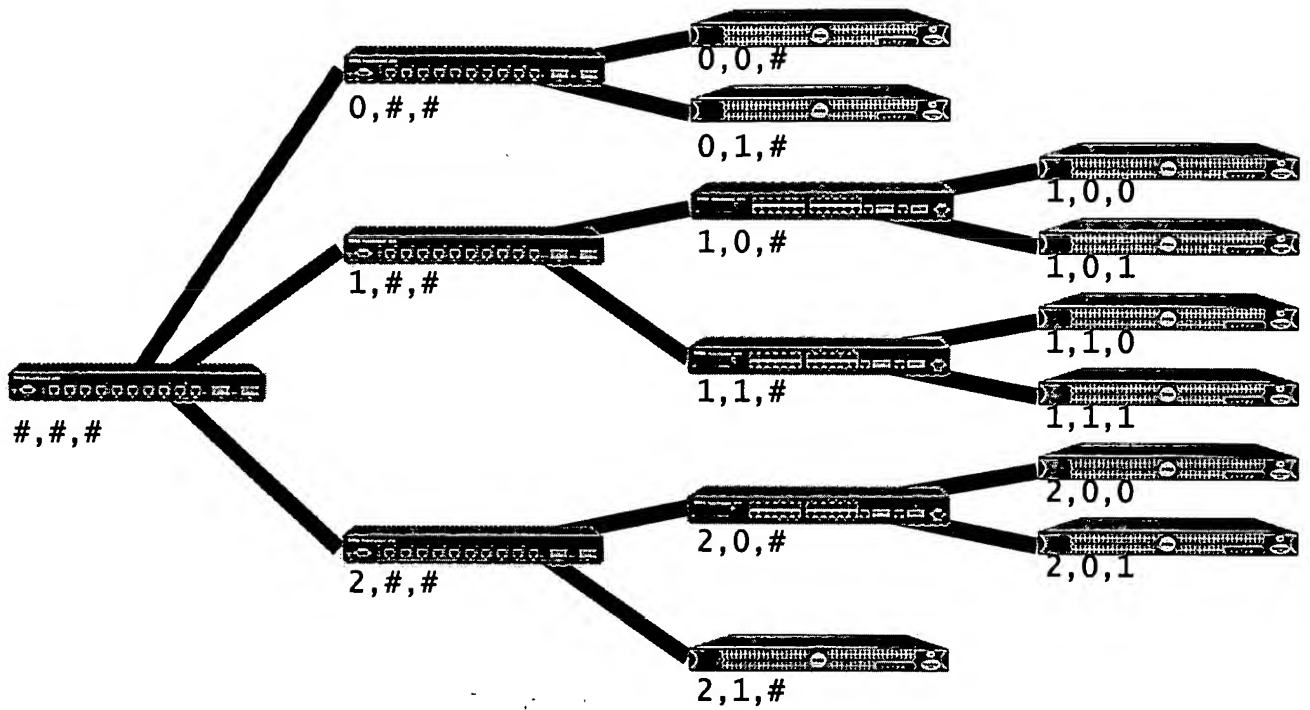


Fig. 66

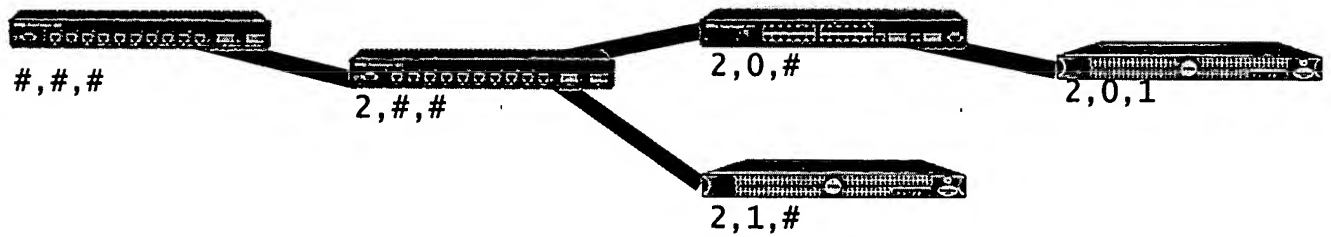
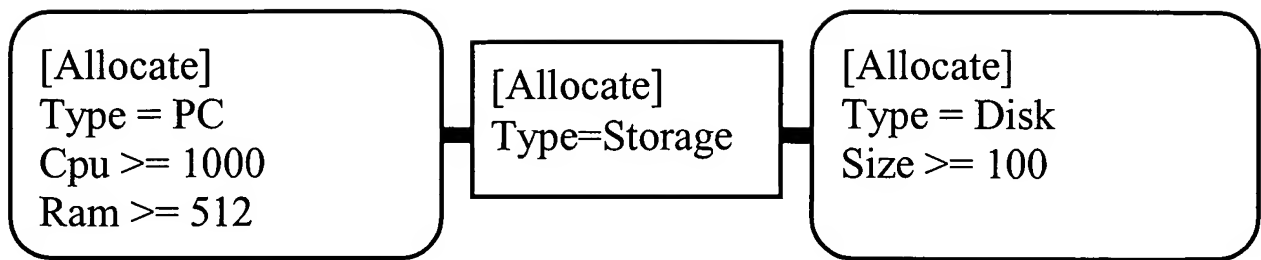
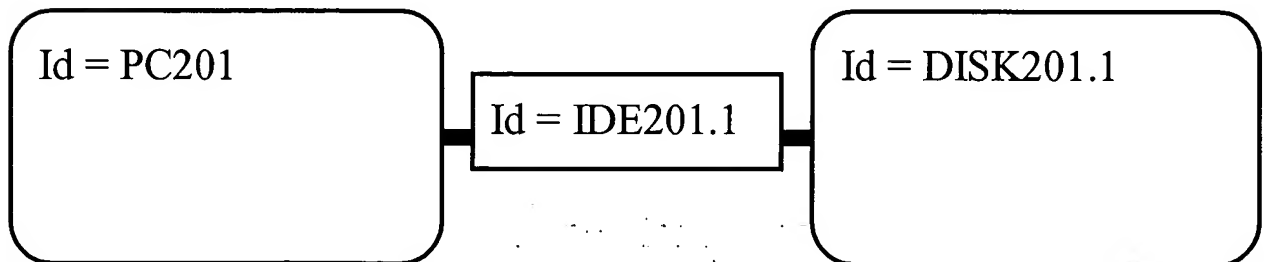
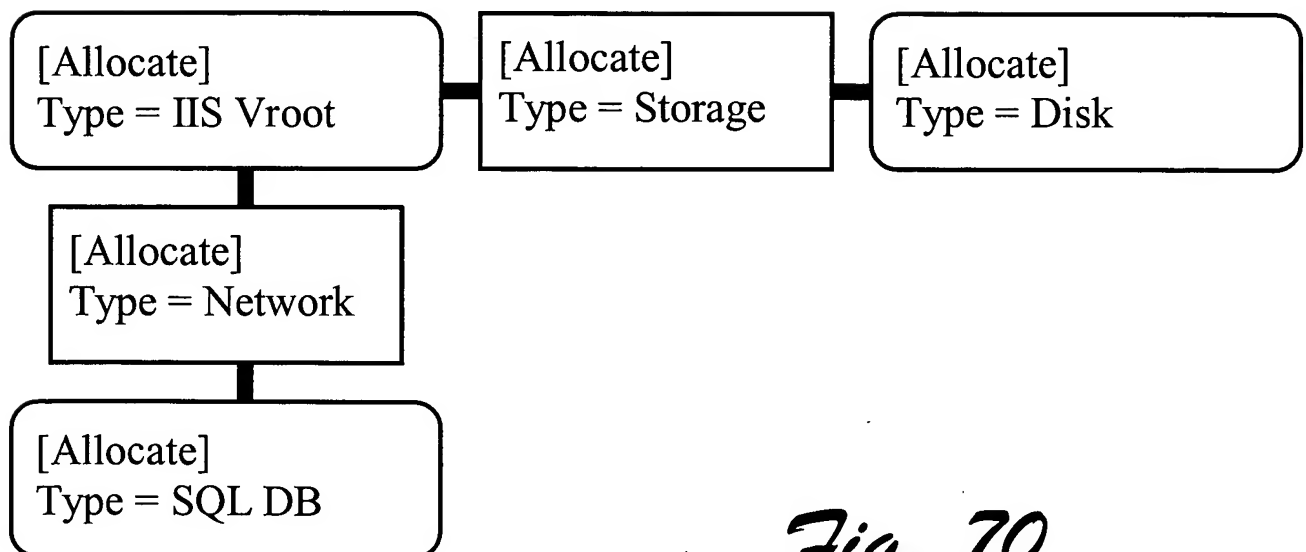
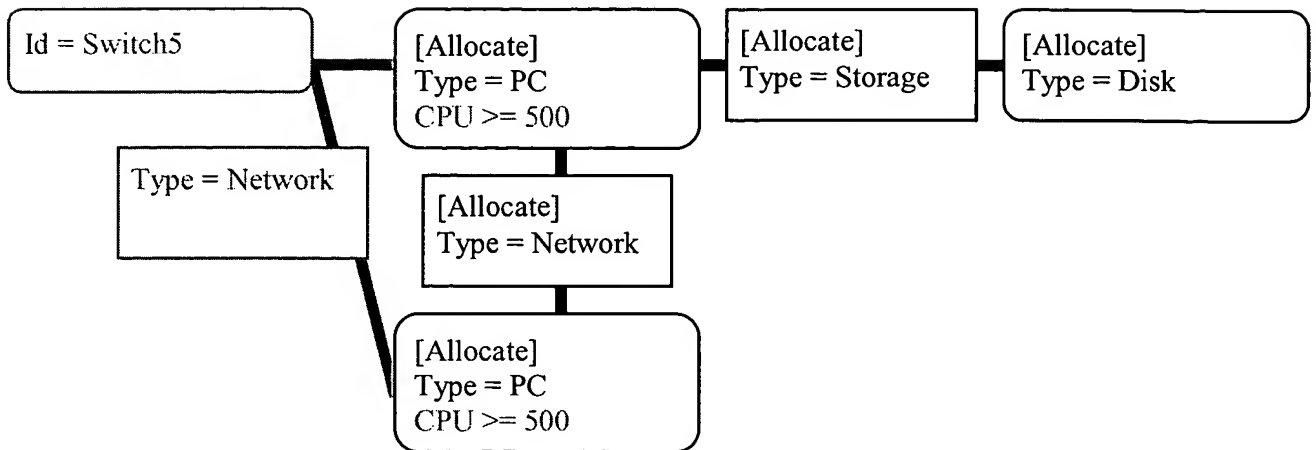
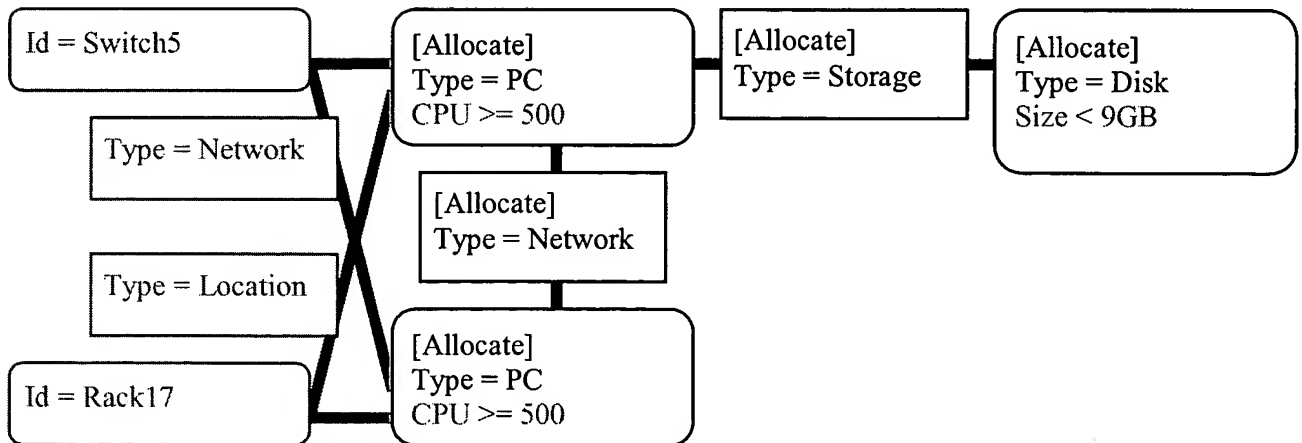


Fig. 67

*Fig. 68**Fig. 69**Fig. 70*

*Fig. 71**Fig. 72*

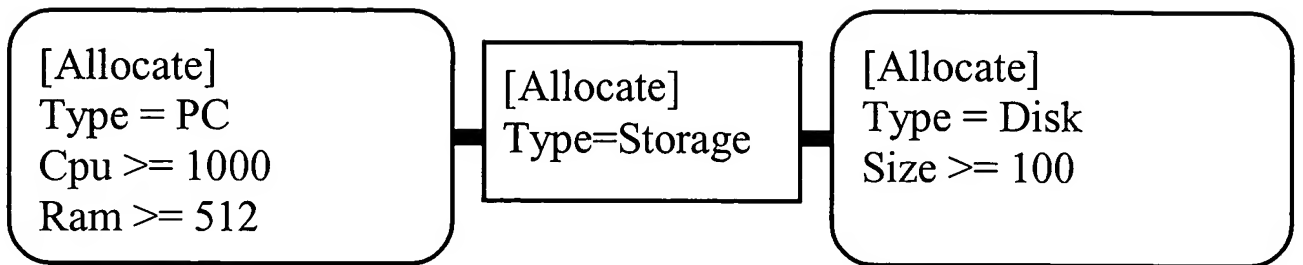
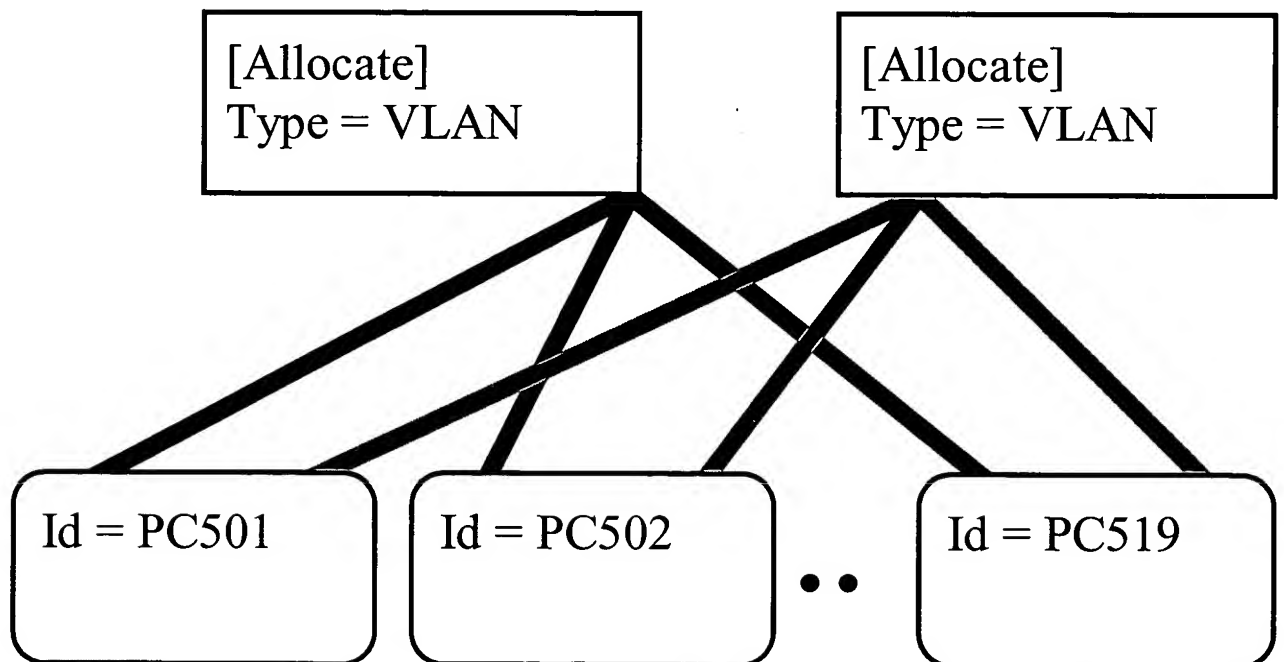
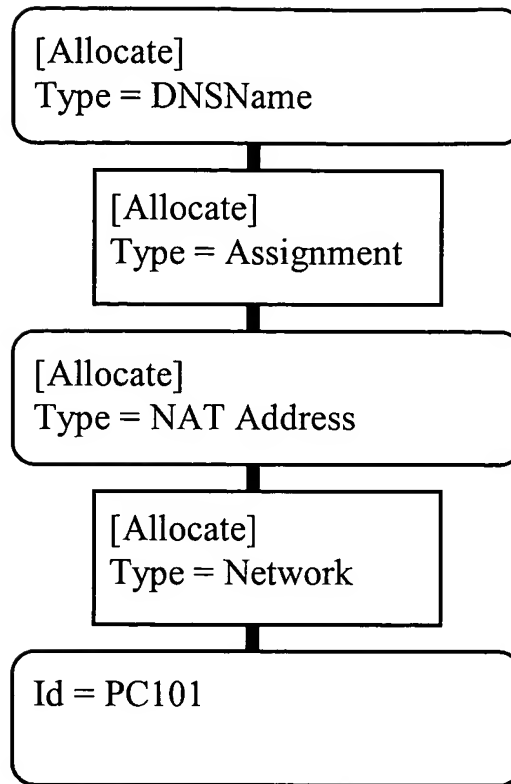
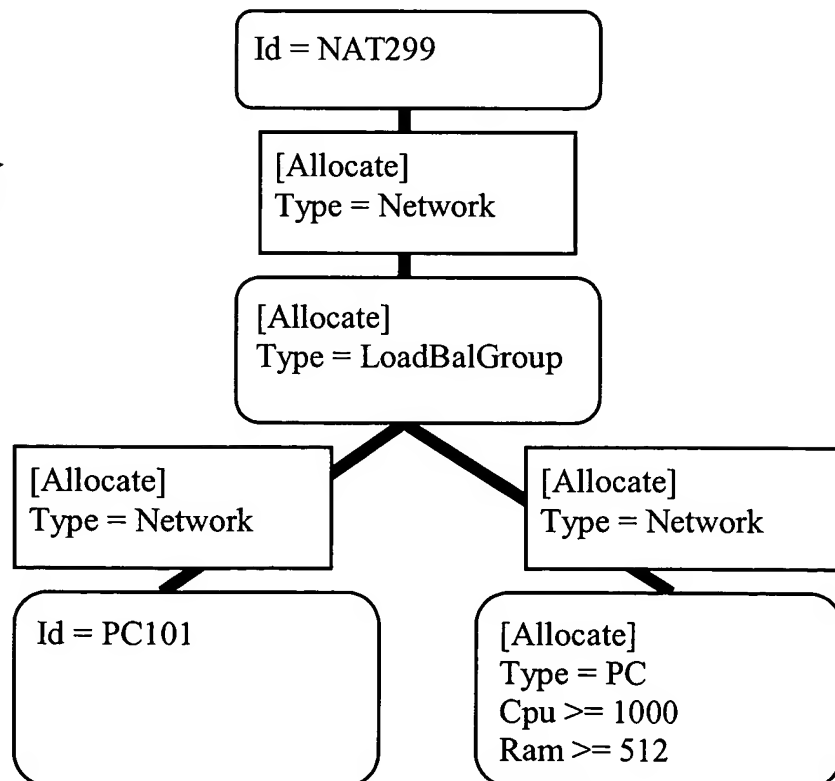
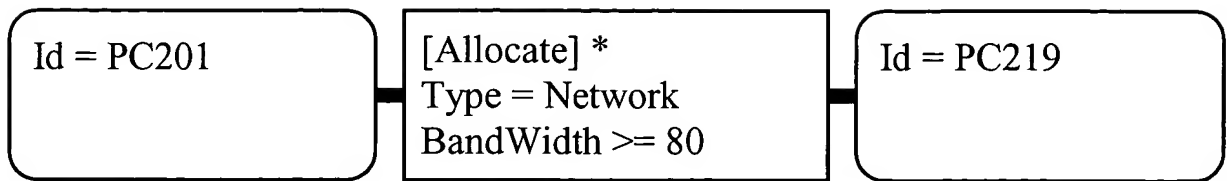
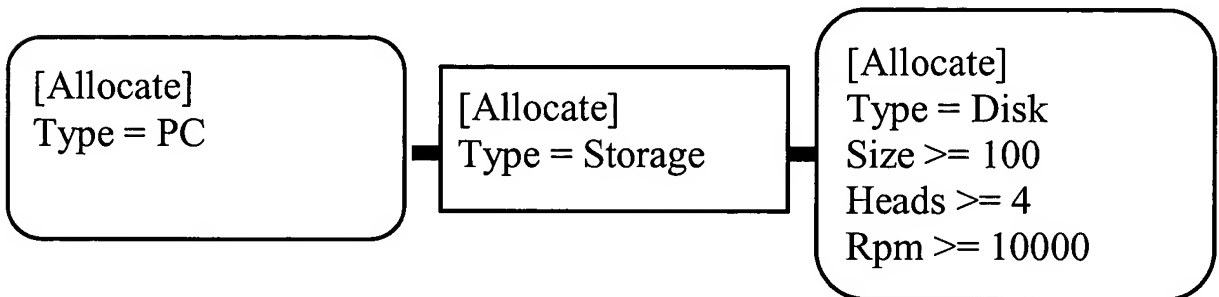
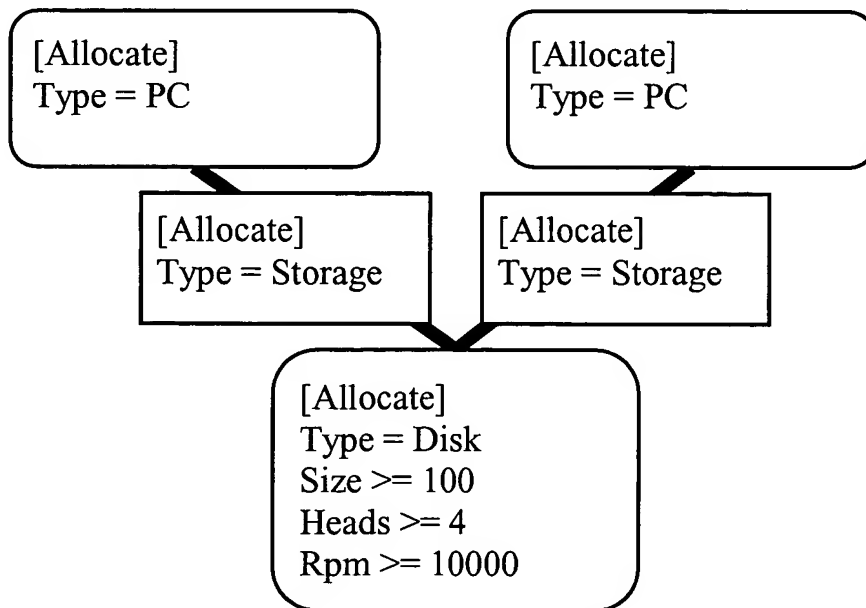
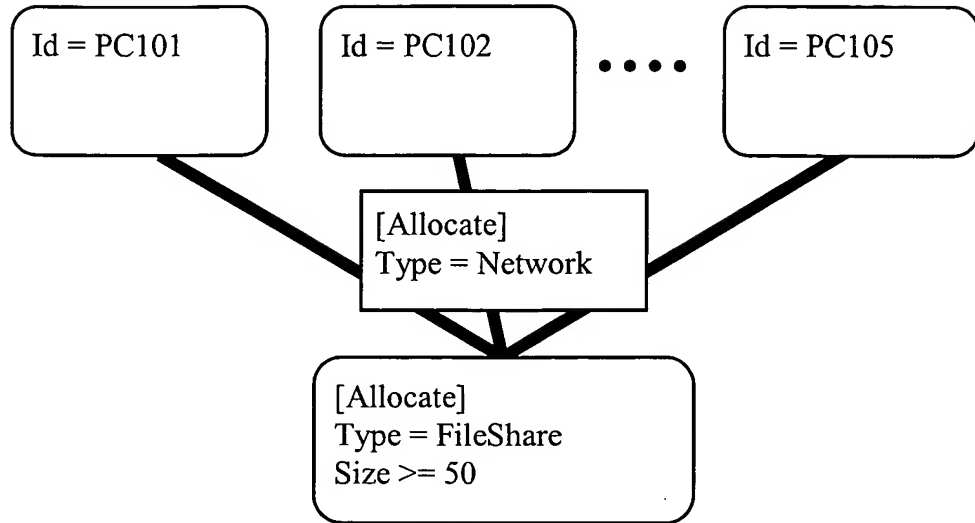
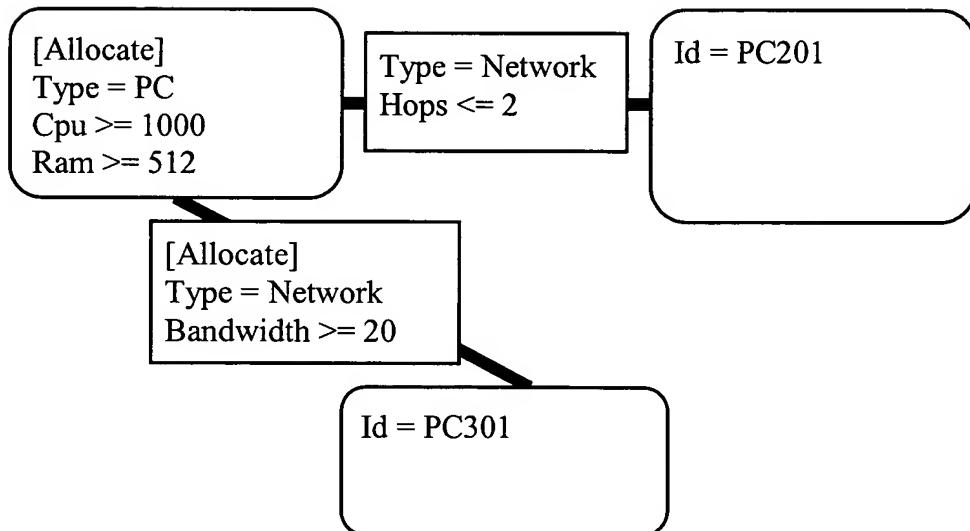
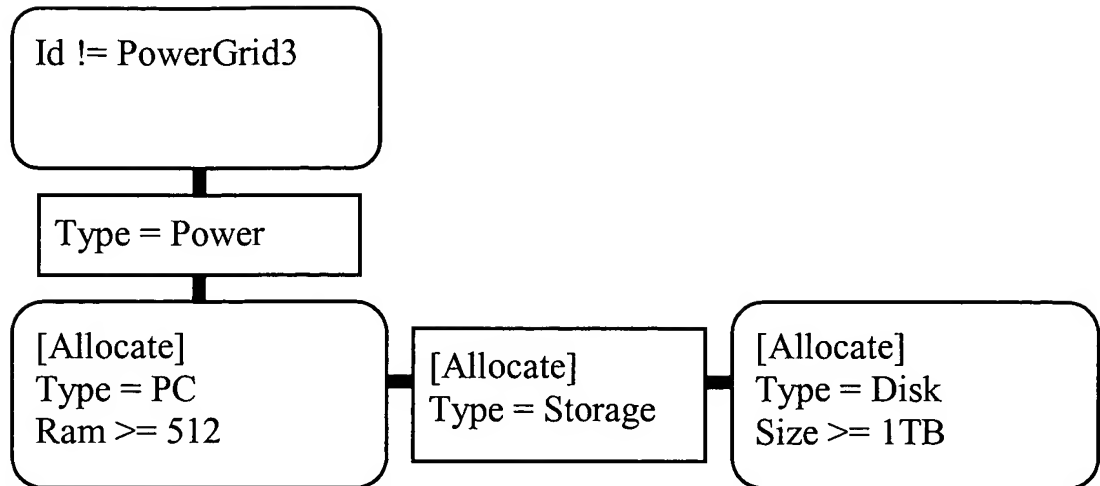
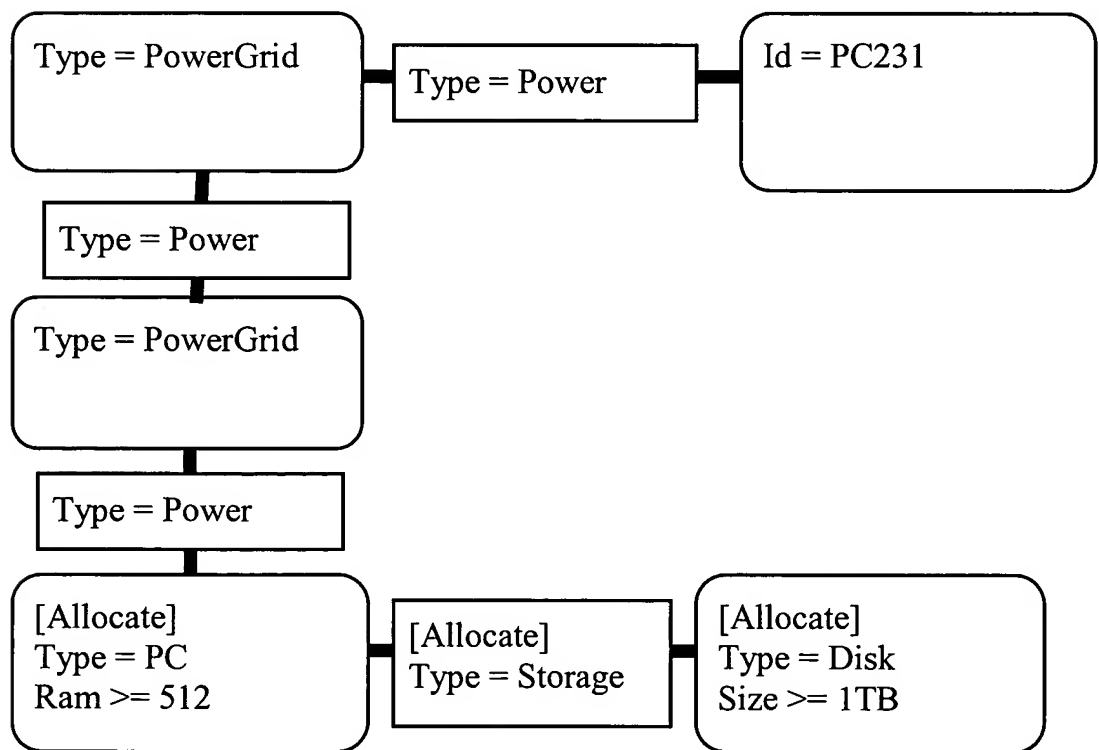
*Fig. 73**Fig. 74*

Fig. 75*Fig. 76*

*Fig. 77**Fig. 78**Fig. 79*

*Fig. 80**Fig. 81*

*Fig. 82**Fig. 83*

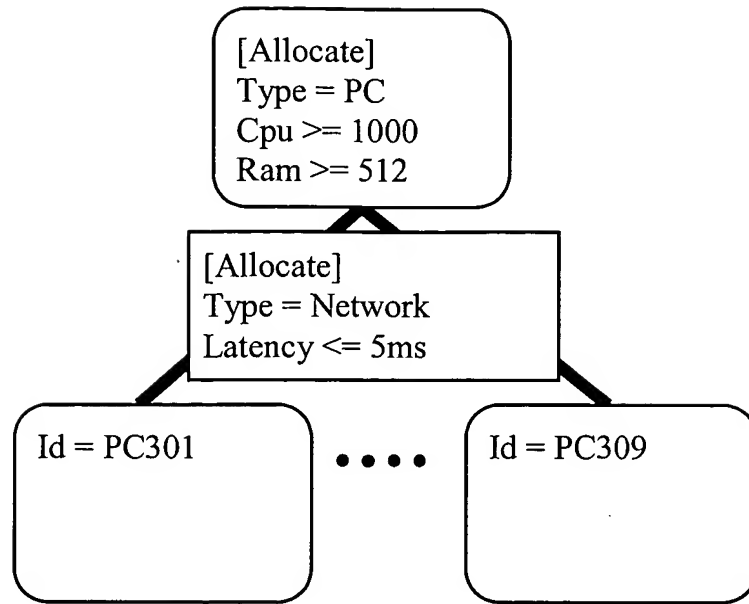


Fig. 84

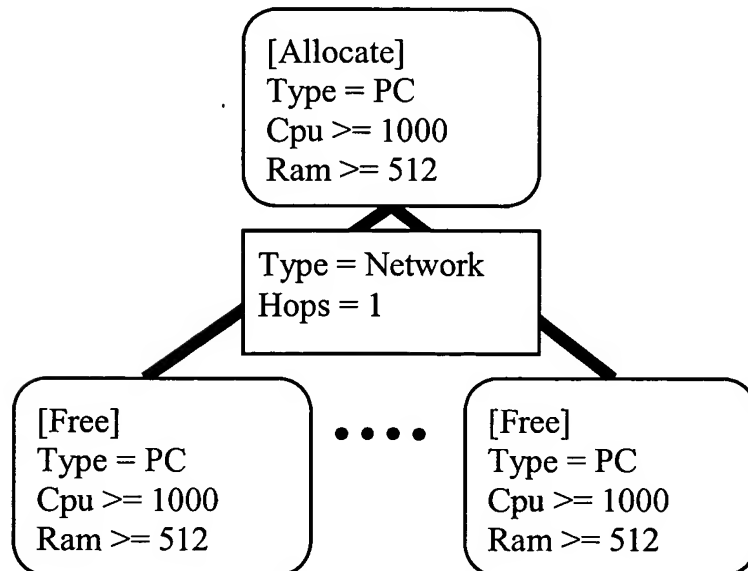
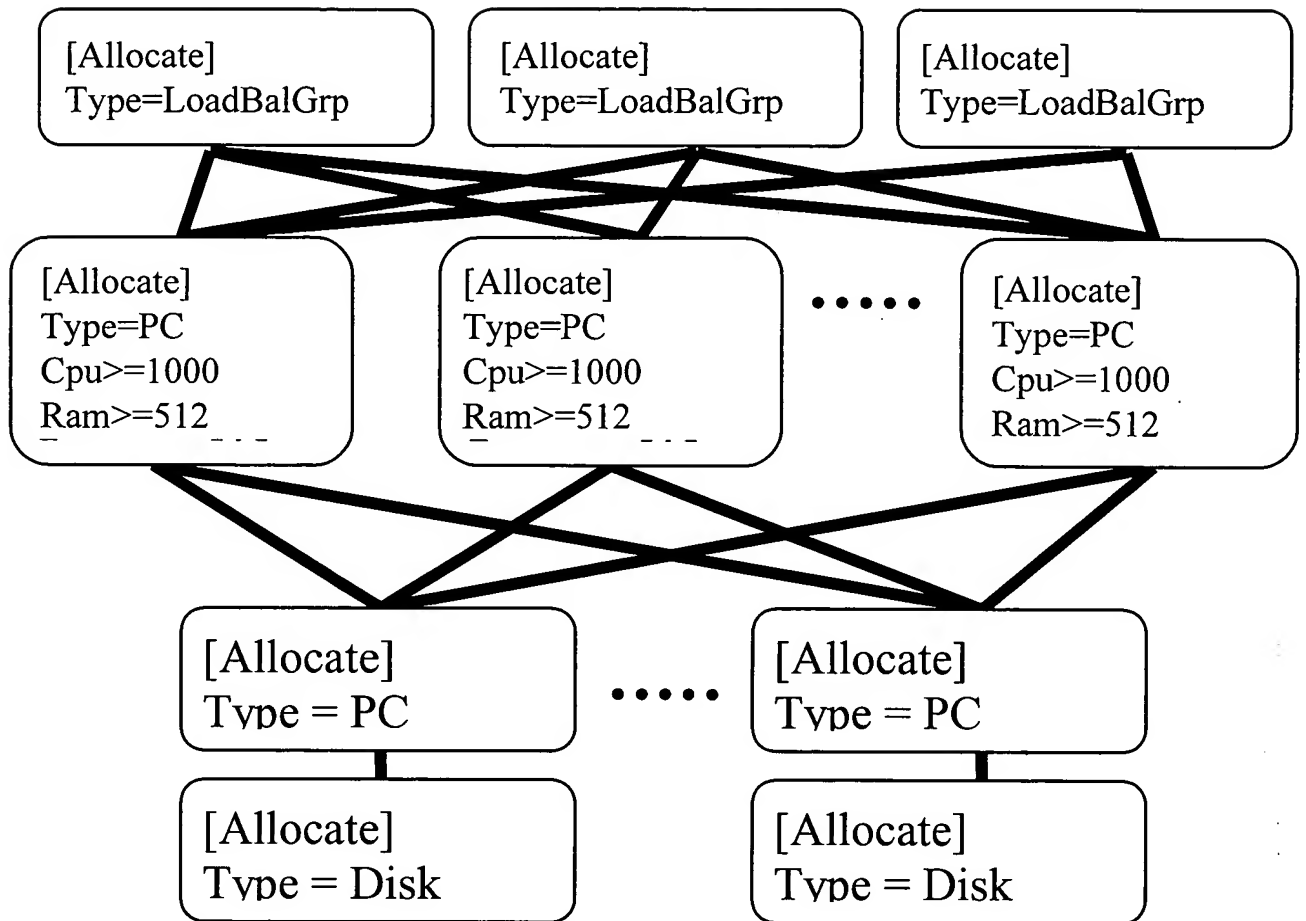


Fig. 85

*Fig. 86*

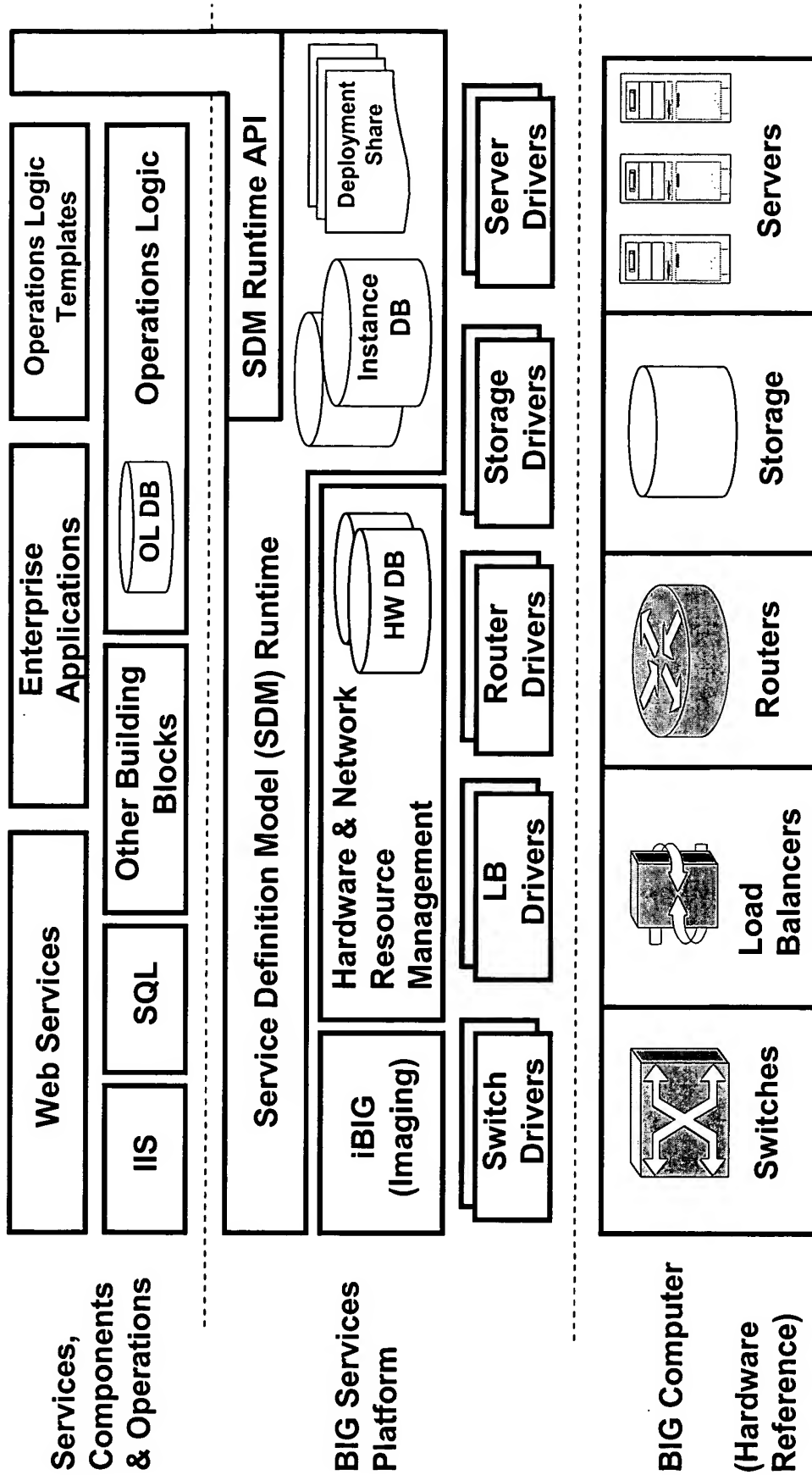


Fig. 87

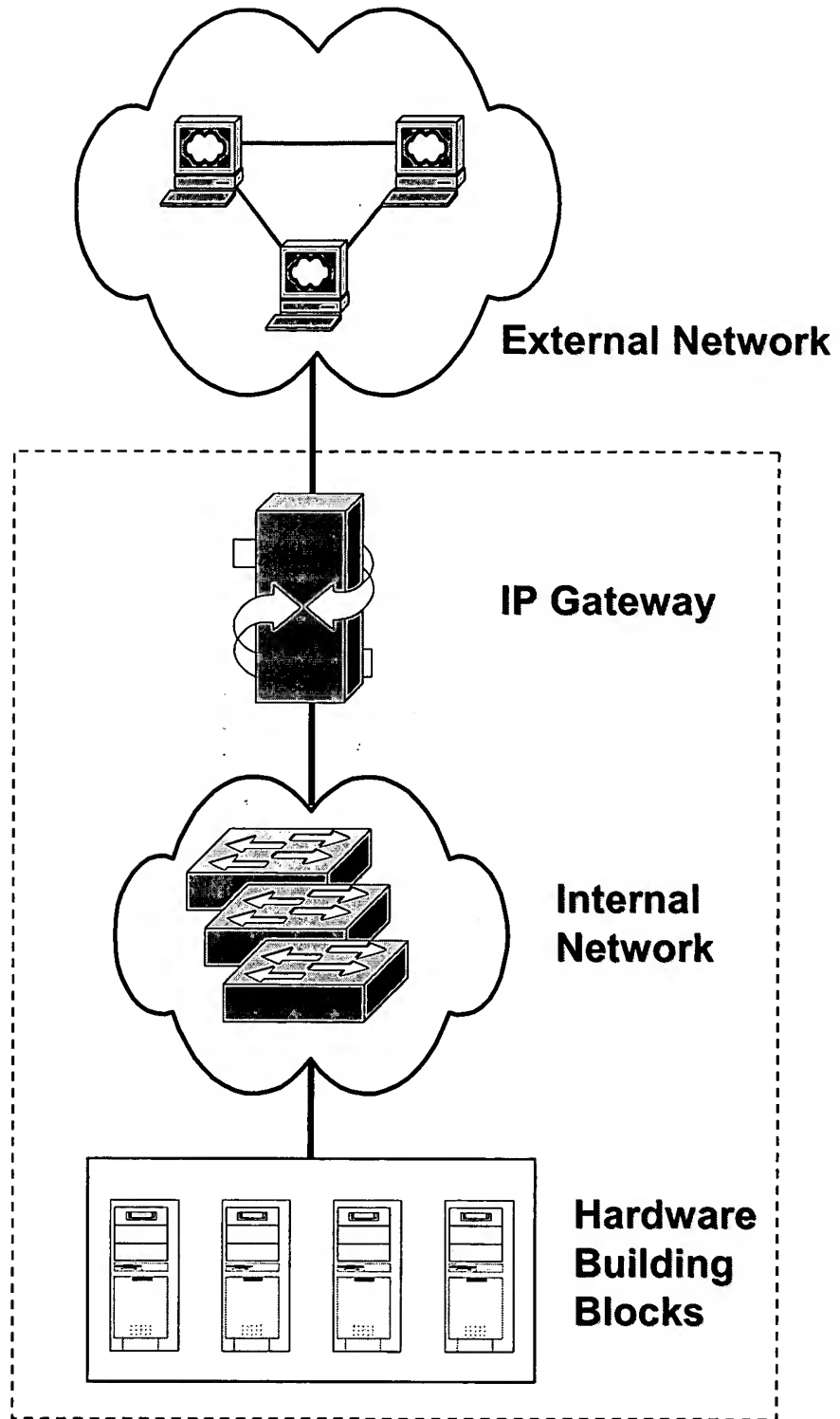
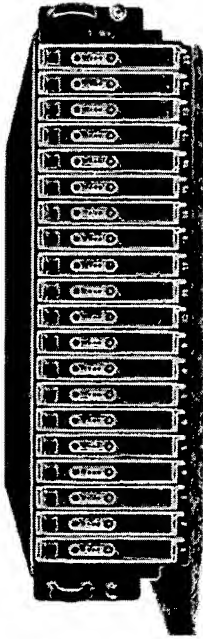
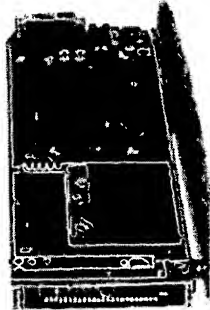


Fig. 88

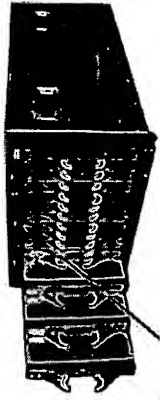
BL10e



3U enclosure (20 blades)

HPQ Proliant BL e-class

- Pentium III 700MHz
- 512MB – 1GB ECC RAM
- 30GB ATA Hard Disk
- Dual 10/100 Fast Ethernet
- Layer 2 switch, (4) Gigabit uplinks
- Redundant 600 W power supplies
- 280 blades per 42U rack, 25W per slot



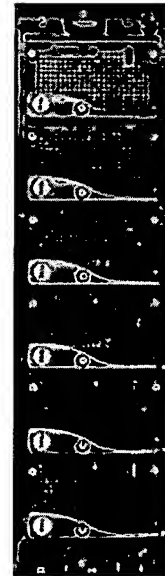
7U enclosure (14 blades)

IBM BladeCenter

- Dual Xeon
- 8GB ECC RAM
- iSCSI or Fibre Channel storage
- (4) Gigabit Ethernet
- (4) 1200 W power supplies
- 98 blades per 42U rack

Dell PowerEdge 1655MC

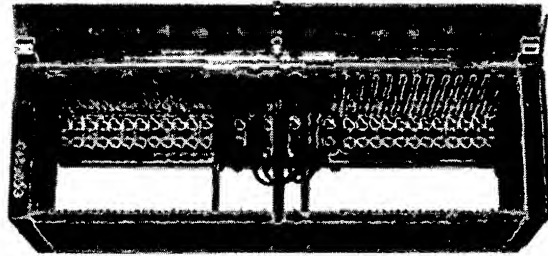
- Dual Pentium III 1.2GHz
- 128MB – 2GB ECC RAM
- 36-146GB SCSI Hard Disk
- Dual Gigabit Ethernet
- (2) Layer 2 switches, (4) Gigabit uplinks
- Redundant 1040 W power supplies
- 84 blades per 42U rack



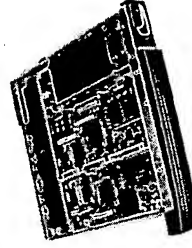
3U enclosure (6 blades)

egenera BladeFrame

- 2 or 4-way Xeon 1.4GHz
- 12GB ECC RAM
- Redundant 10/100, 1 Gb or Fibre Channel
- Redundant power supplies
- Hot pluggable blades
- 24 processing blades per rack



Control Blade



Processing Blade

Fig. 89

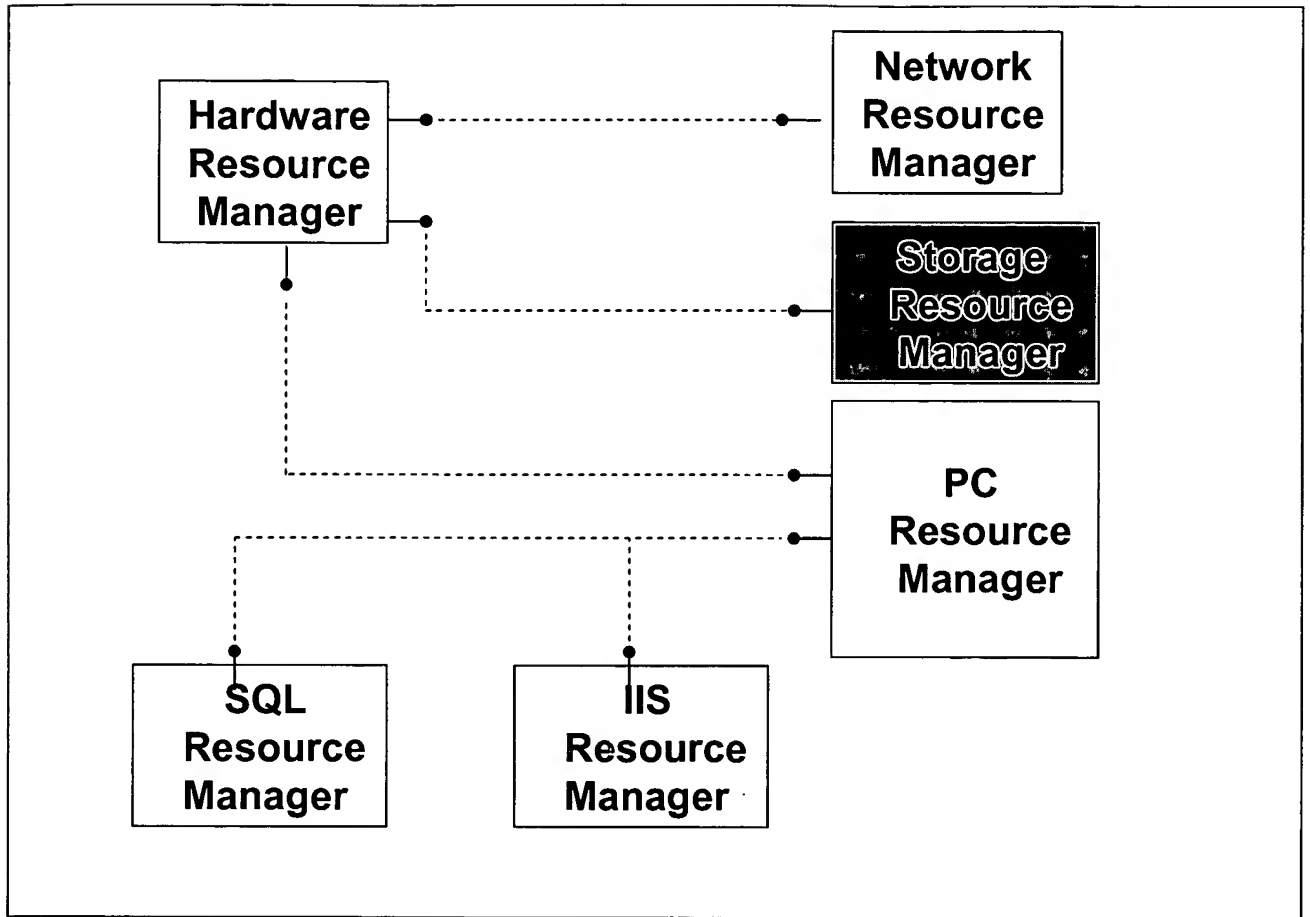
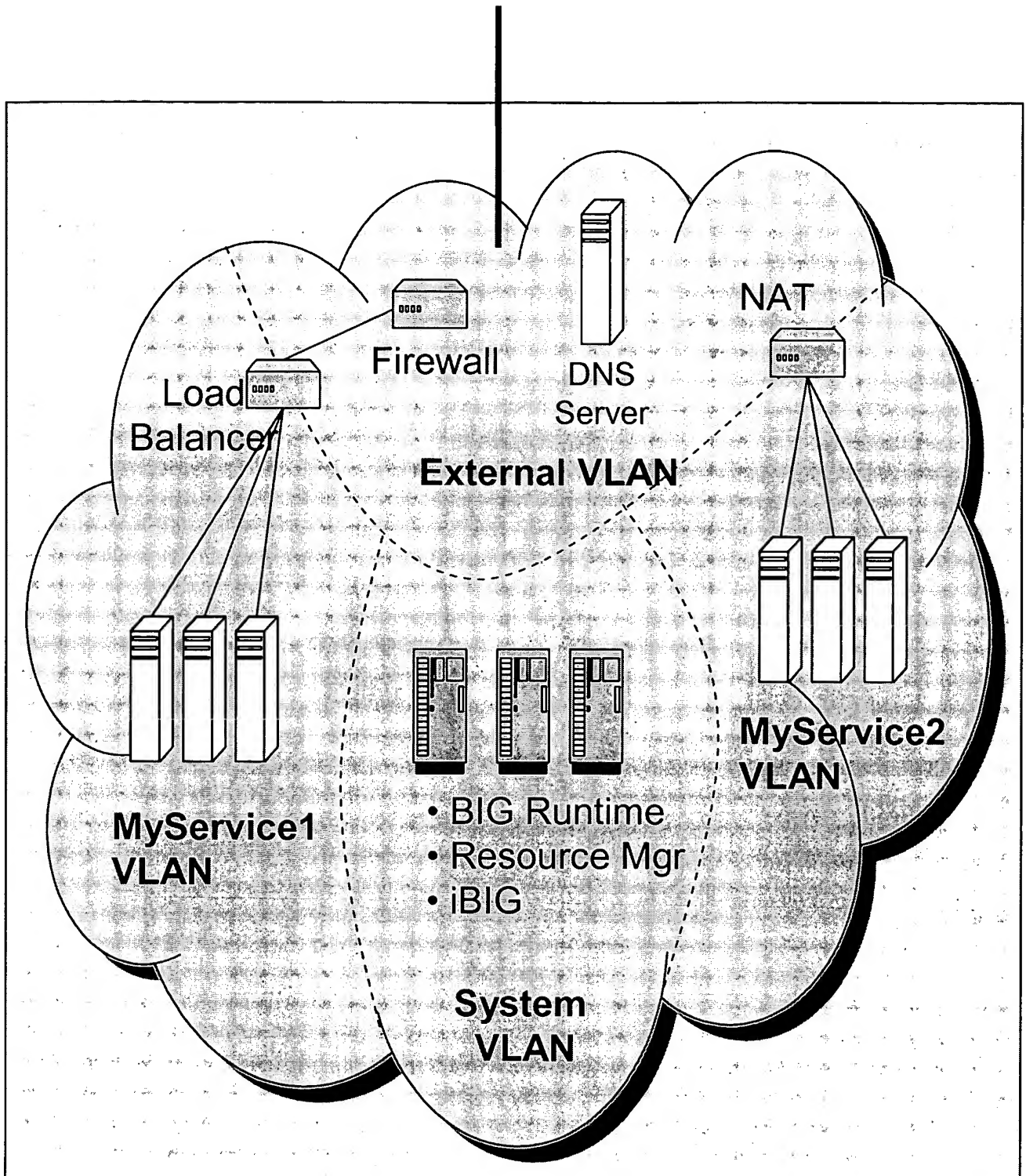
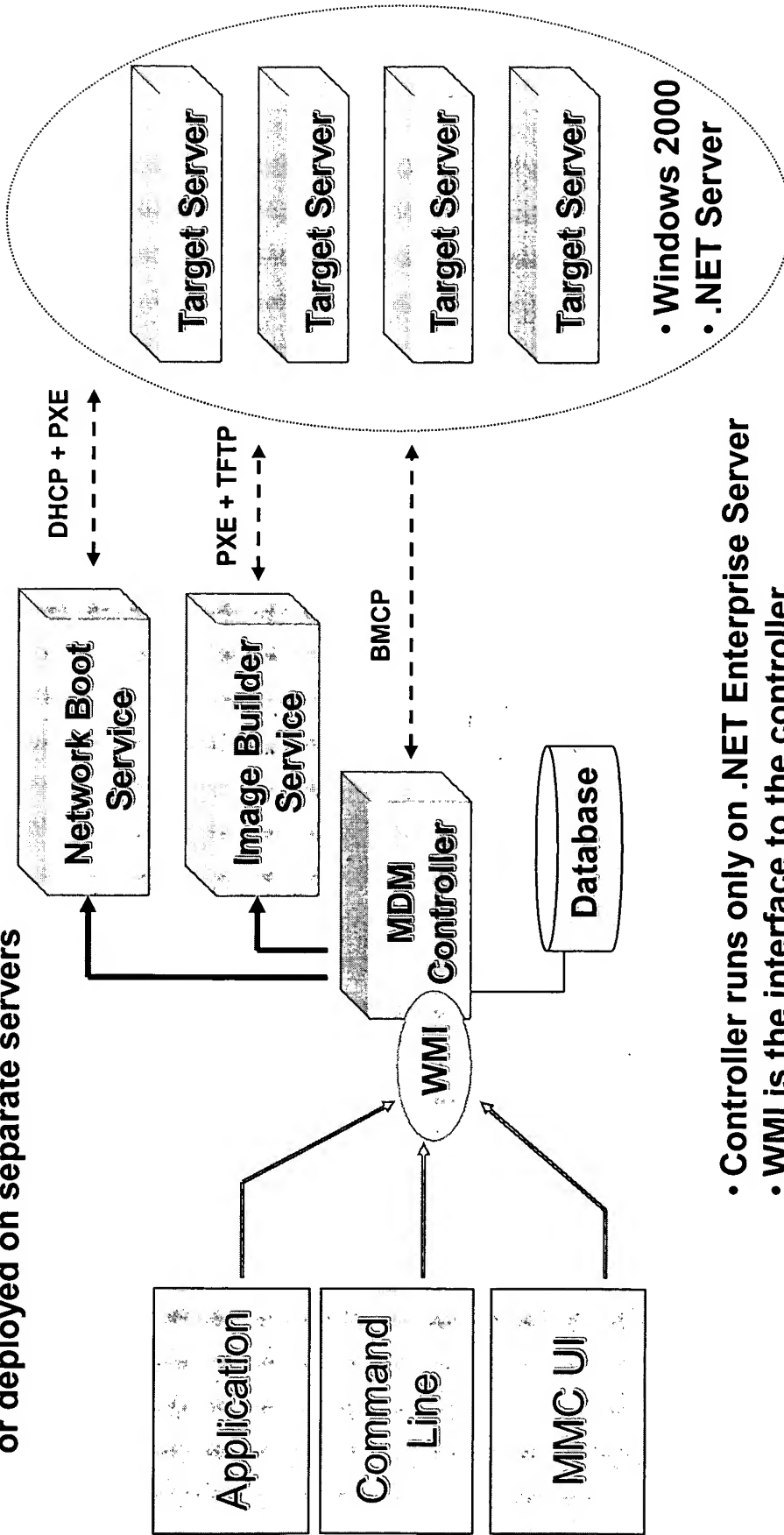


Fig. 90

*Fig. 91*

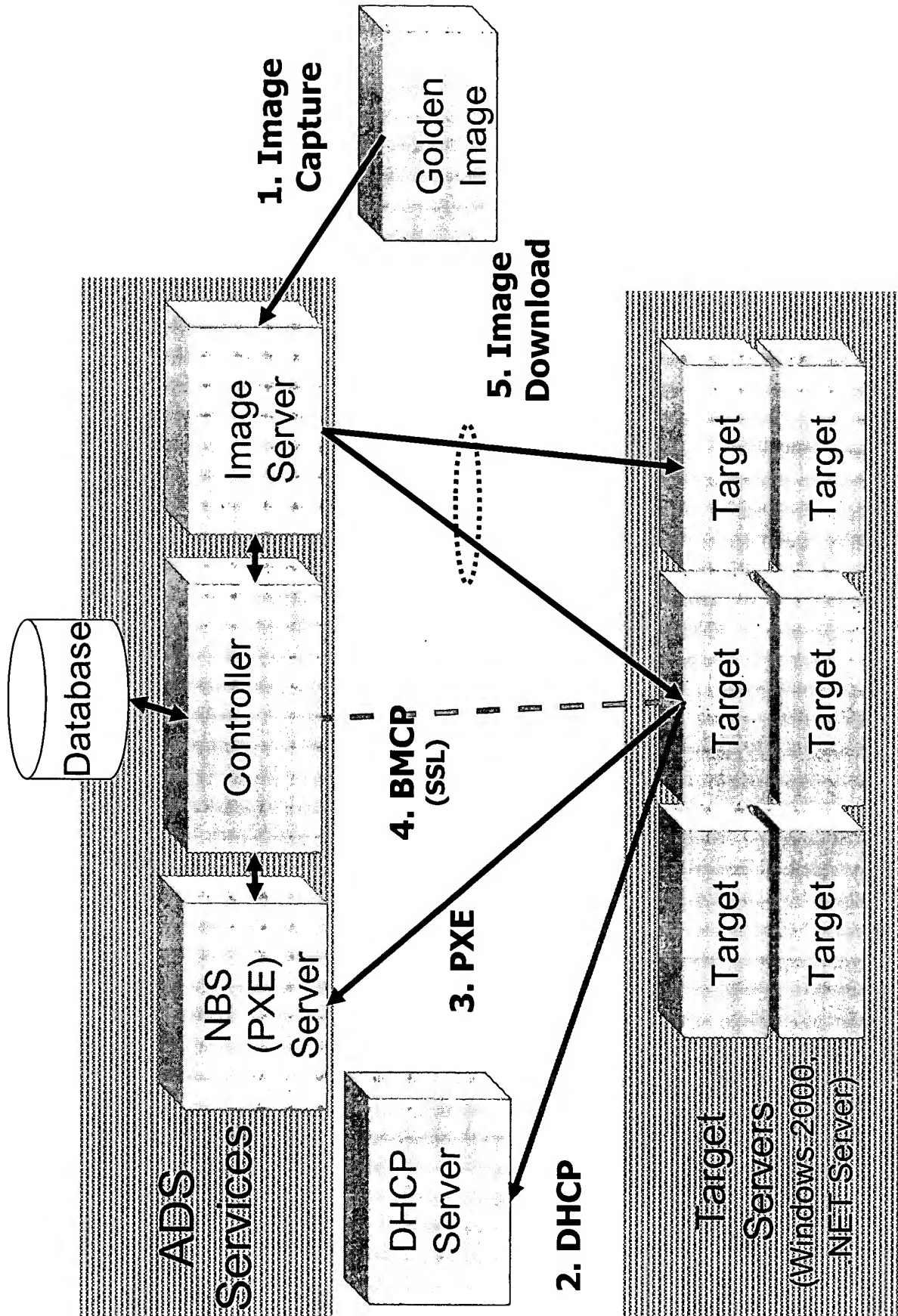
Target servers run ADS
'agent' to communicate
with controller

ADS Services can be co-located
or deployed on separate servers



- Controller runs only on .NET Enterprise Server
- WMI is the interface to the controller

Fig. 92

*Fig. 93*

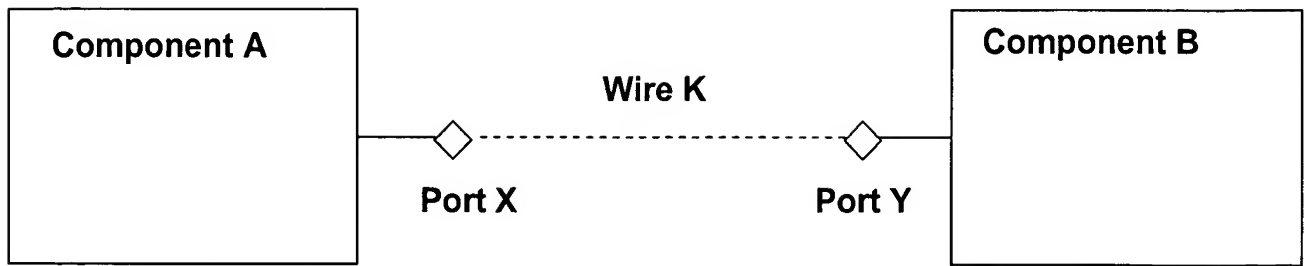


Fig. 94

```

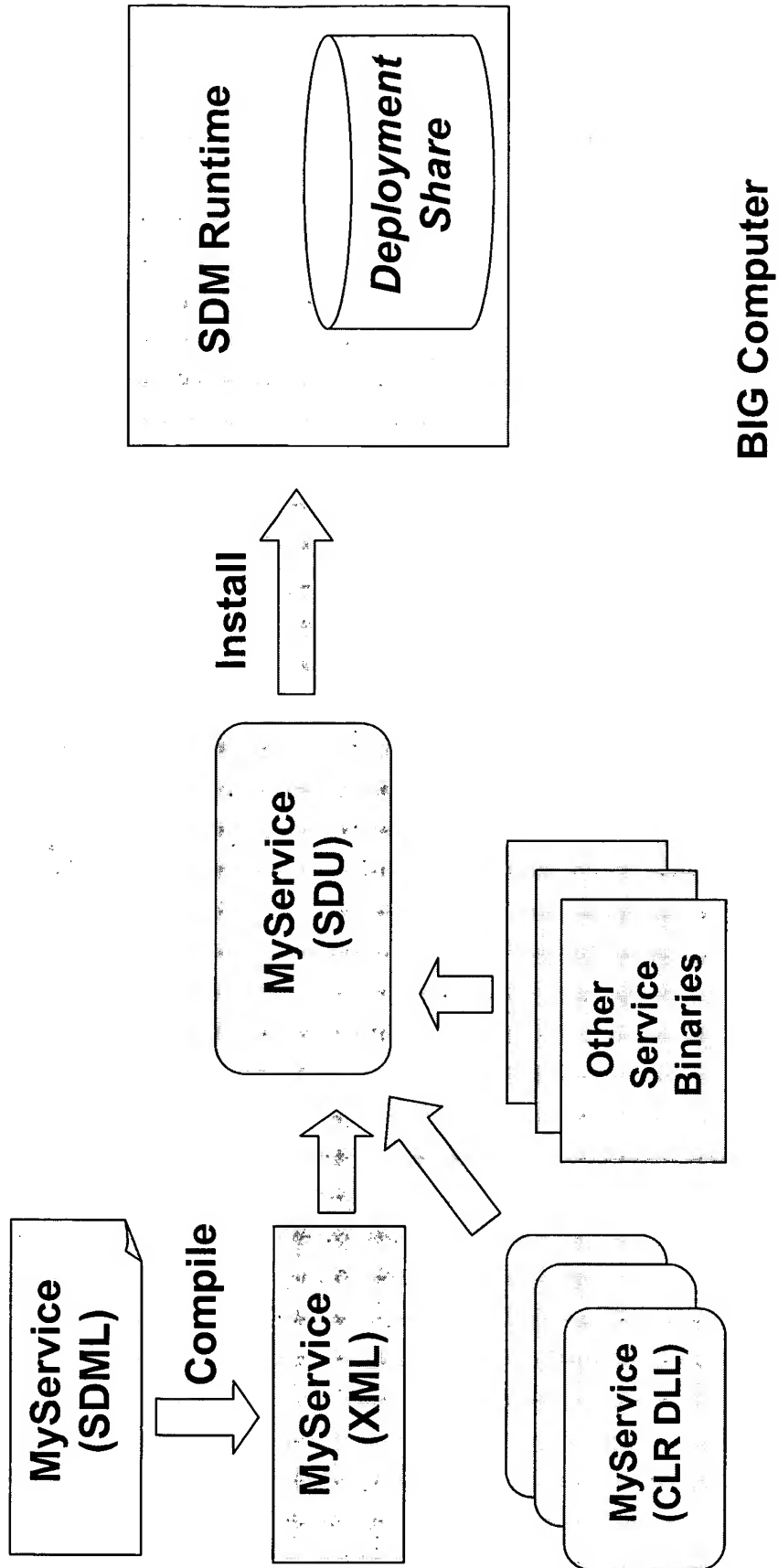
using System;
using System.SQL;
using System.IIS;
assembly name MyService;

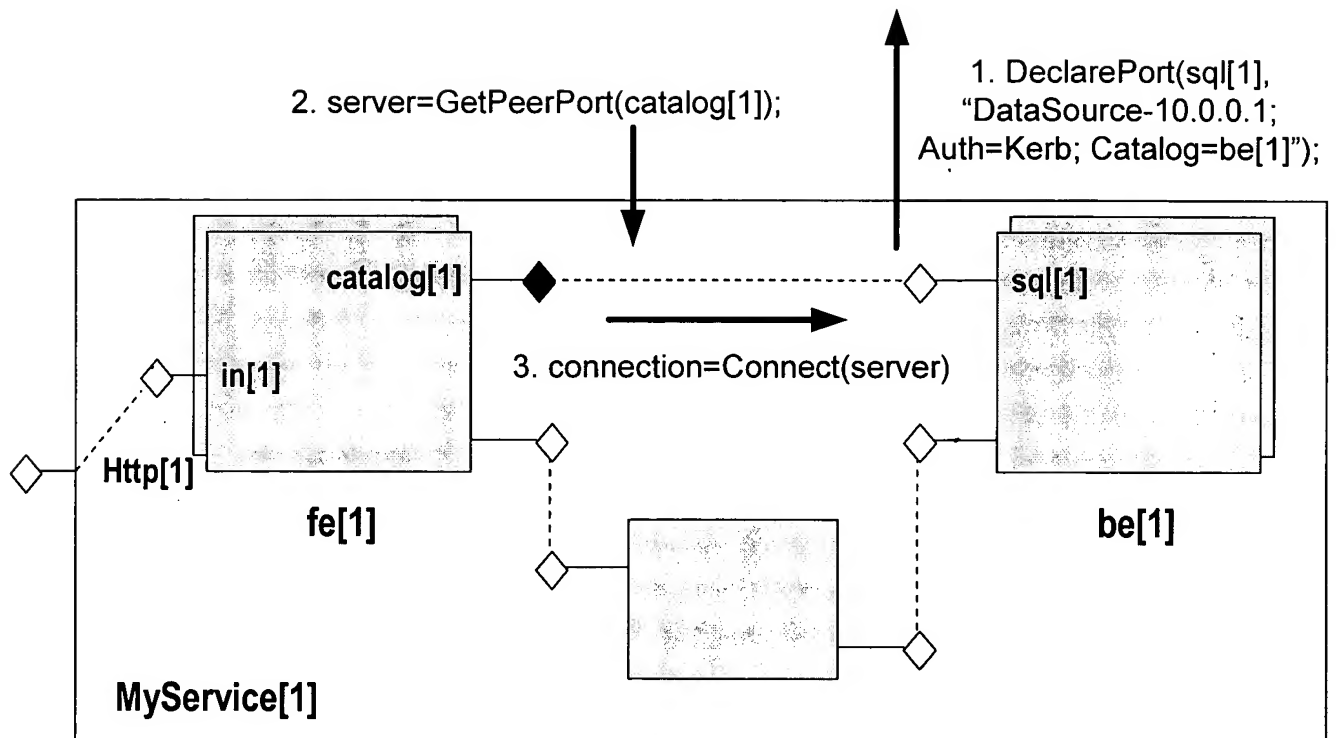
componenttype MyFrontEnd :
  ASPApplication {
    port SQLClient catalog;
    implementation "MyFE, MyCLRApp"
  }
componenttype MyBackEnd :
  SQLDatabase {
    implementation "MySQL, MyCLRApp"
  }
}

componenttype MyService
{
  component MyFrontEnd fe;
  component MyBackEnd be;
  port http = fe.http;
  wire TDS tds {
    fe.catalog;
    be.sql;
  }
  implementation "MyService, MyCLRApp"
}

```

Fig. 95

*Fig. 96*

*Fig. 97*

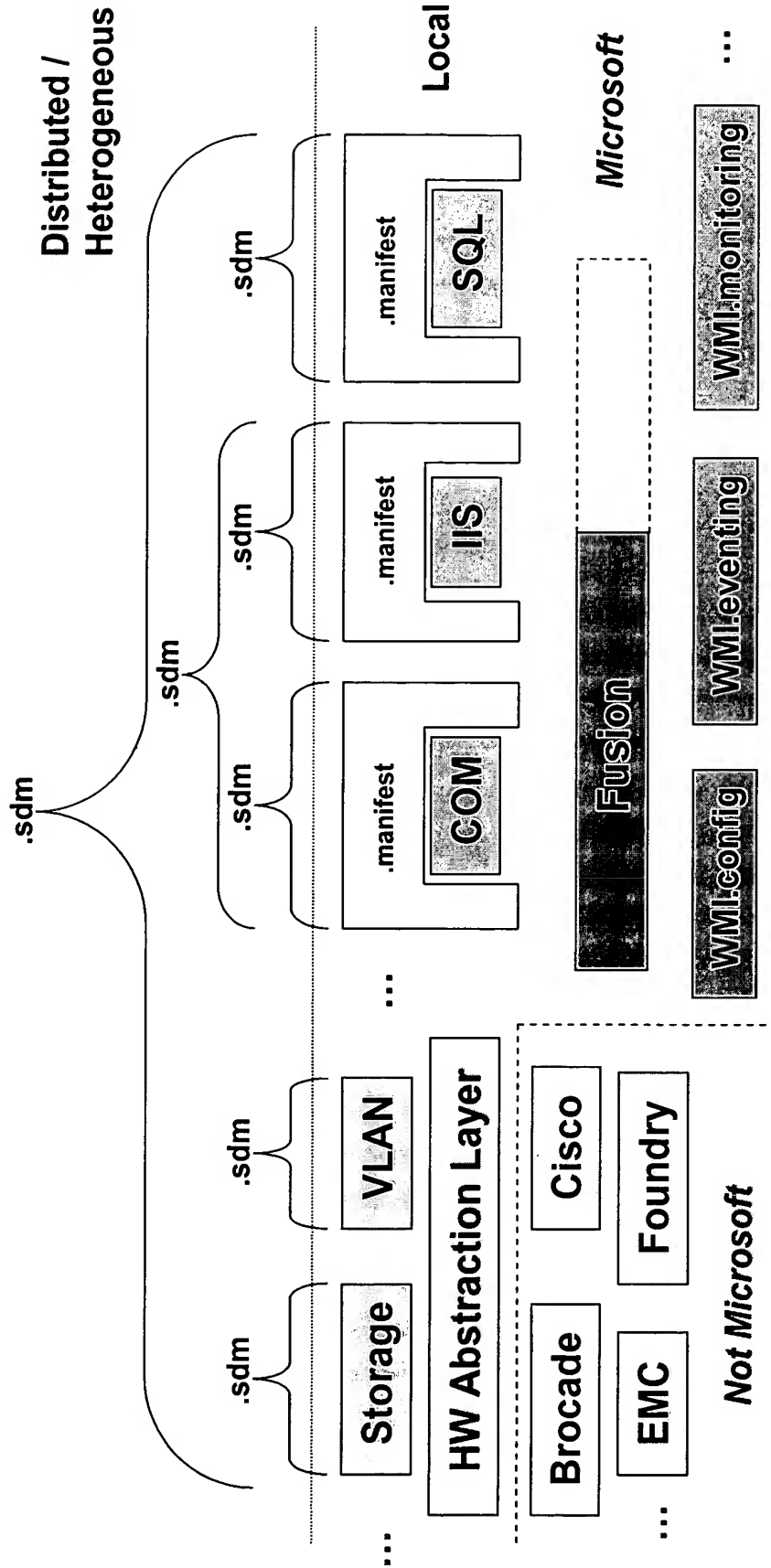


Fig. 98

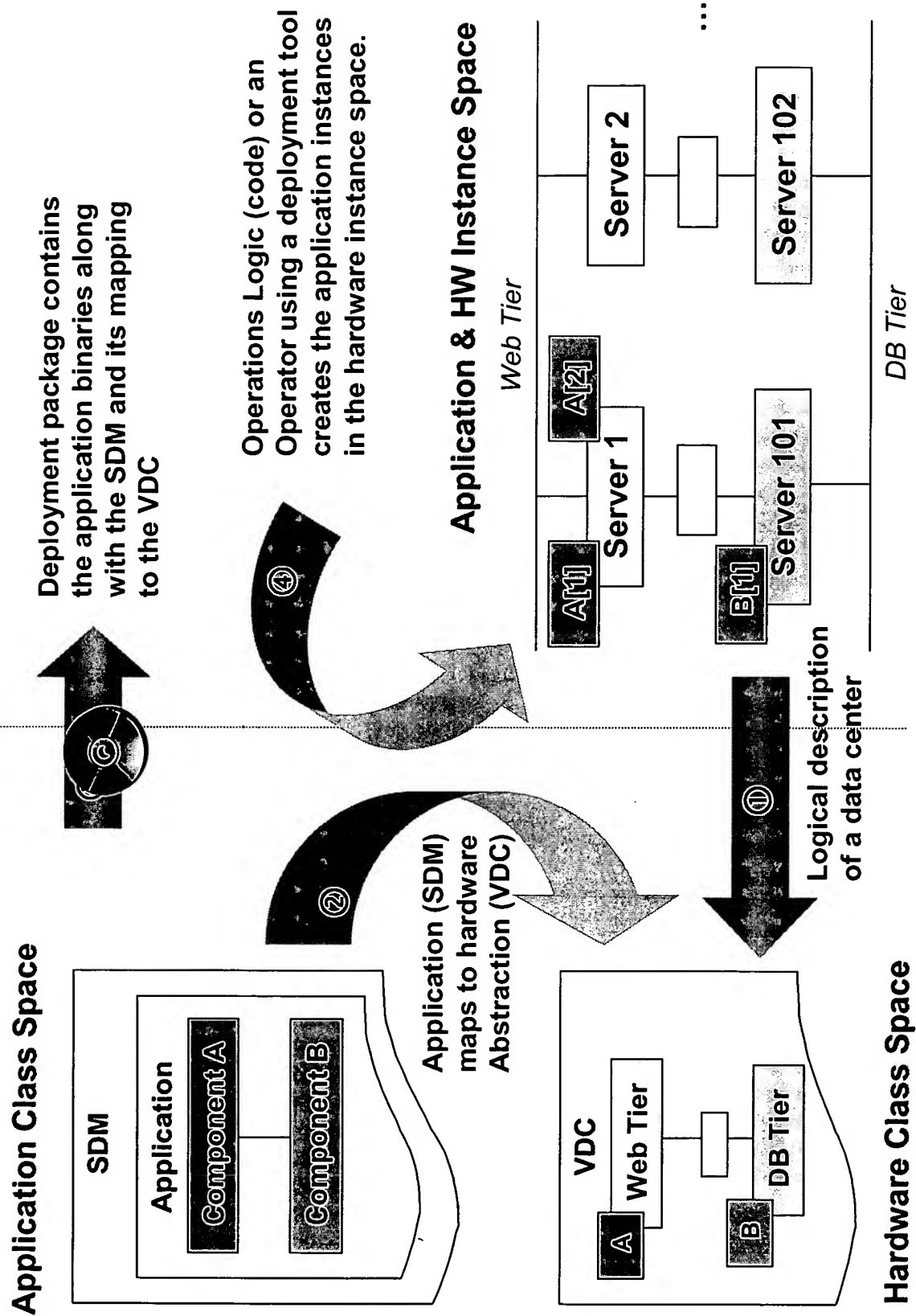


Fig. 99

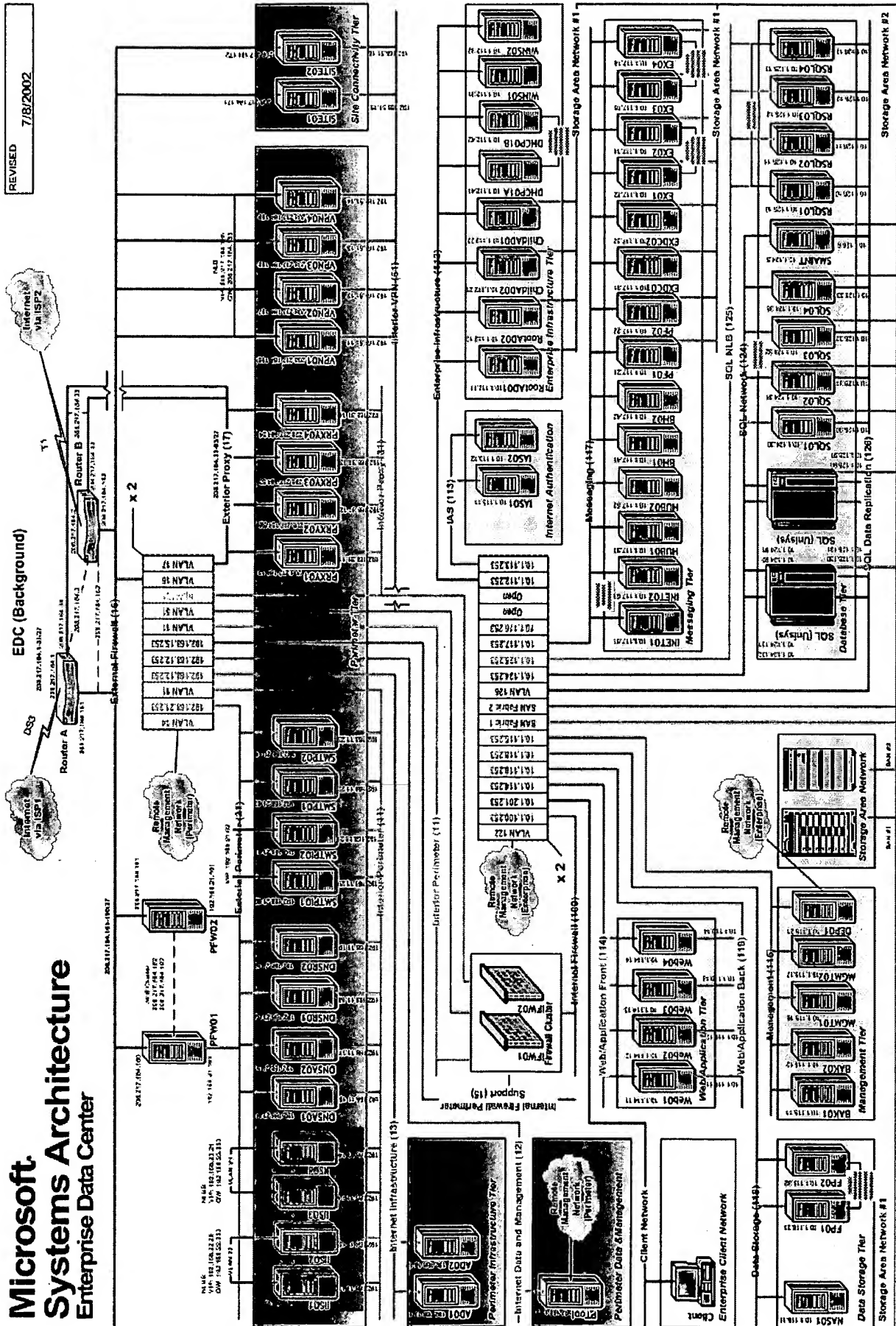


Fig. 100

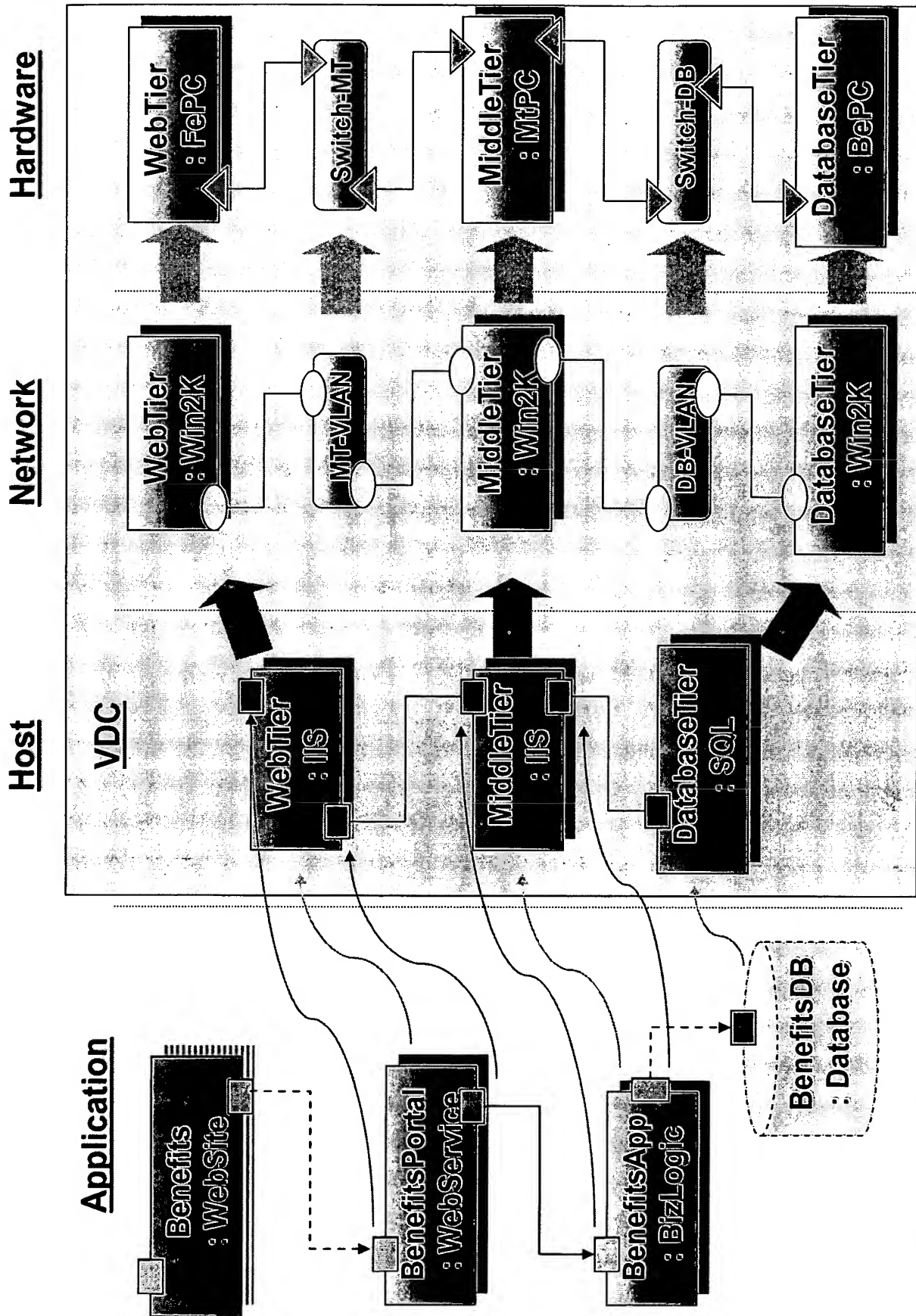


Fig. 101

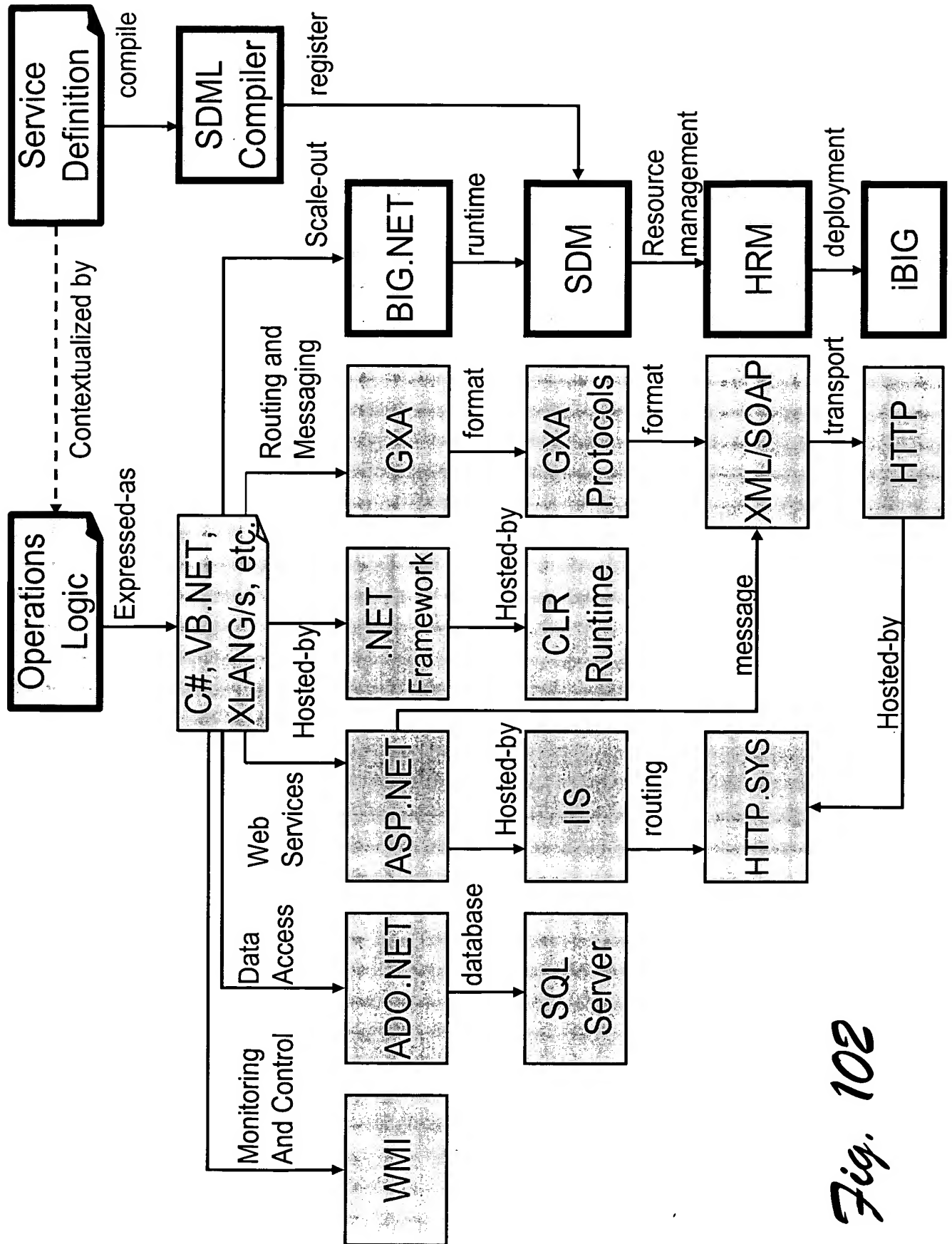
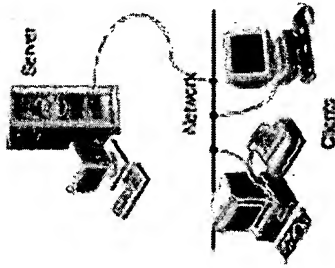


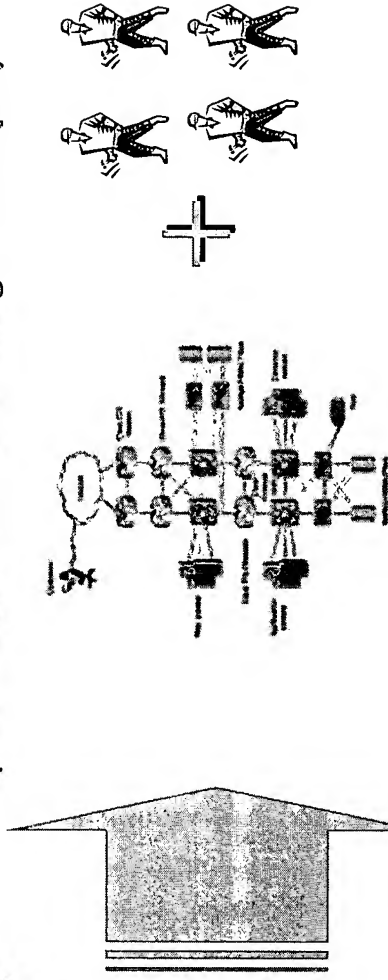
Fig. 102

Yesterday's Monolithic,
Single Server Applications



Before Internet

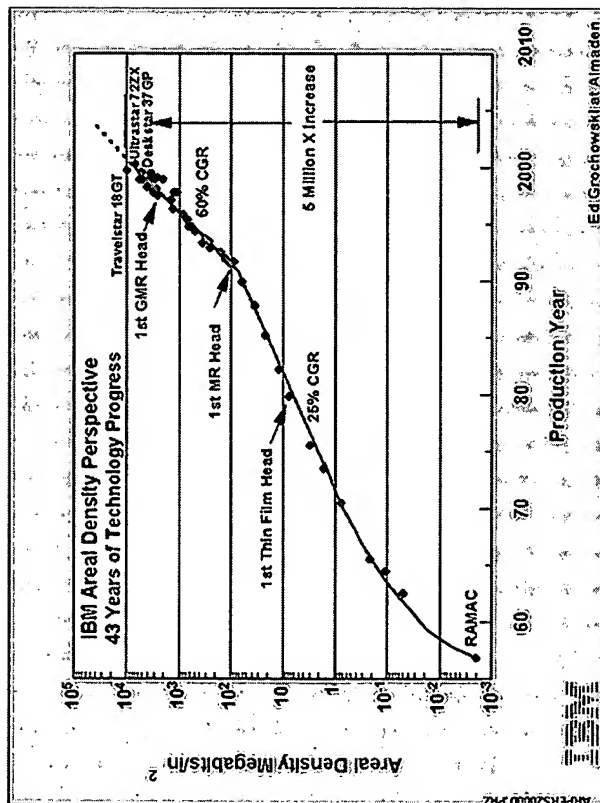
Today's Applications = Services
(SW + Servers/NW/Storage + People)



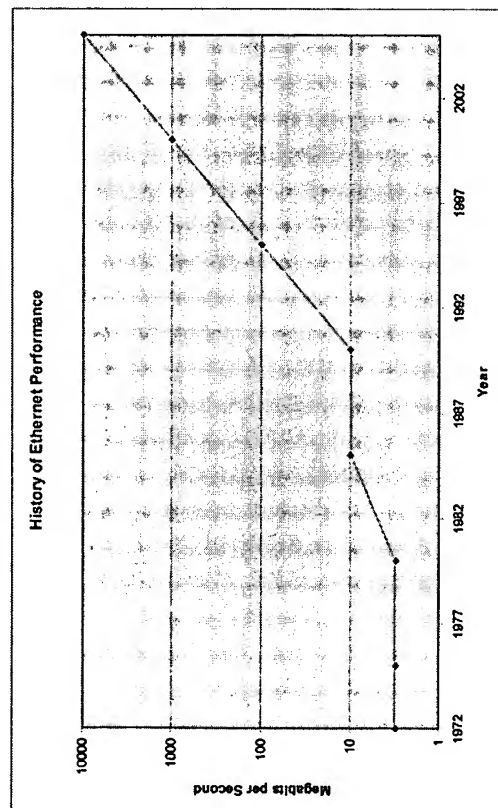
After Internet

<u>Audience</u>	Small, trusted	Infinite, Potentially hostile
<u>Usage</u>	Constant and Predictable	Unpredictable with much wider variations
<u>Service Level</u>	Low Availability Tolerated	Greatly increase service level expectations

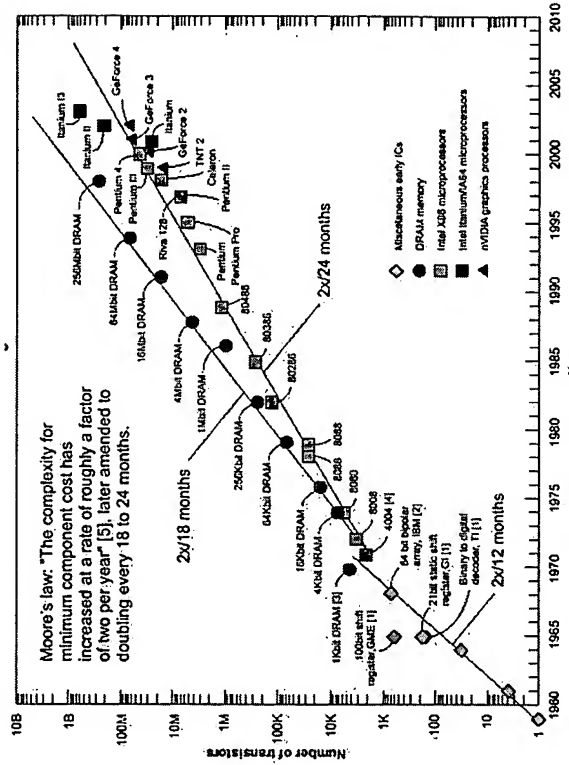
Fig. 103



Denser disks



Fatter pipes



- [1] Stanley Mazur, "The History of the Microcomputer: Invention and Evolution" <http://www.ozapack.com/microcomputer/Invention.htm>.
 [2] Gordon E. Moore, "Cramming more components onto integrated circuits," *Electronics*, Vol. 38, N. 6, Apr. (1965).
 [3] Gordon E. Moore, "Cramming more components onto integrated circuits," *Electronics*, Vol. 38, N. 6, Apr. (1965).
 [4] Jonathan Casati, "Who Really Invented the Microprocessor," http://www.electronic.com/25year/25_microprocessor2.html.
 [5] Gordon E. Moore, "Cramming more components onto integrated circuits," *Electronics*, Vol. 38, N. 6, Apr. (1965).

More powerful CPUs

Fig. 104

85% of the cost is driven by people, availability and training

$$\text{TCO}_{\text{Service}} = \text{People} + \text{Downtime} + \text{Training} + \text{HW/SW}$$

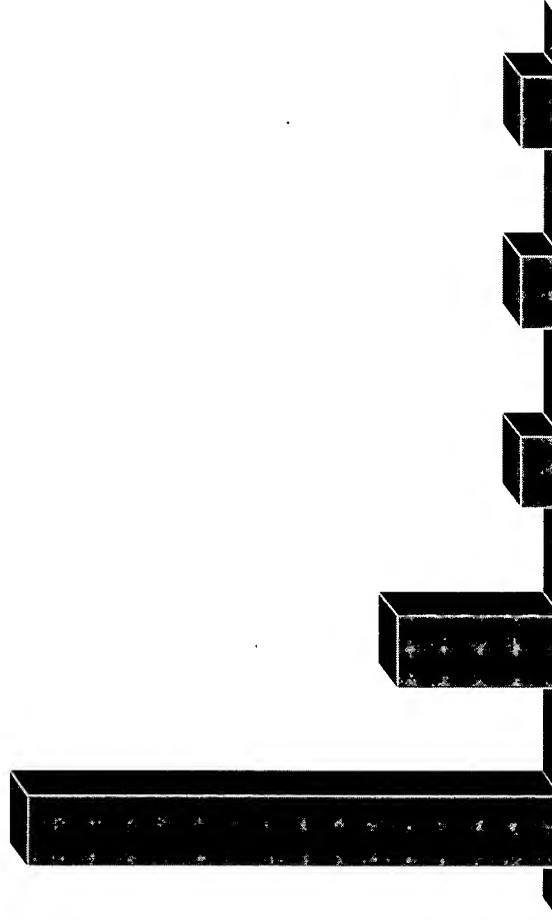


Fig. 105

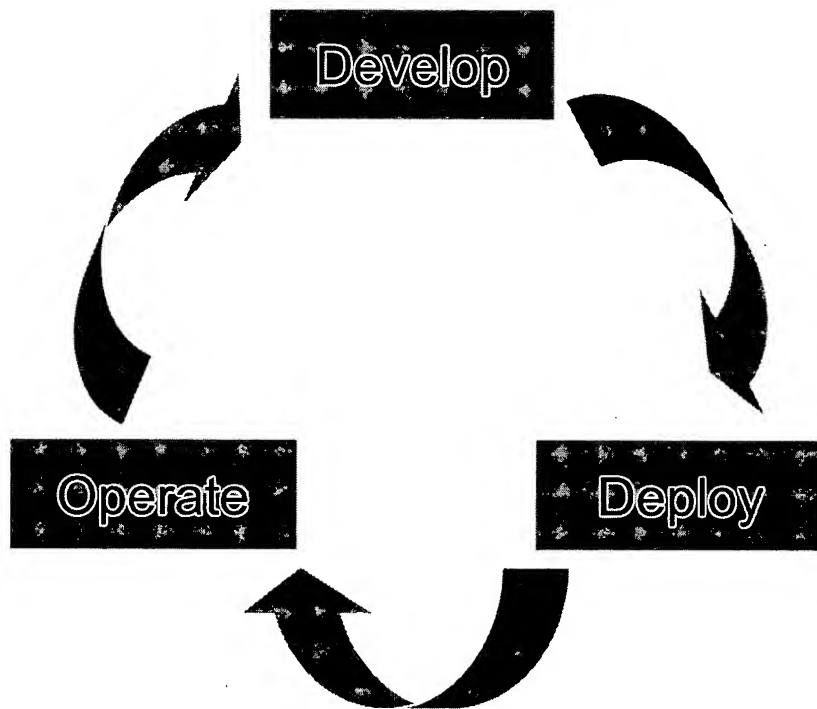
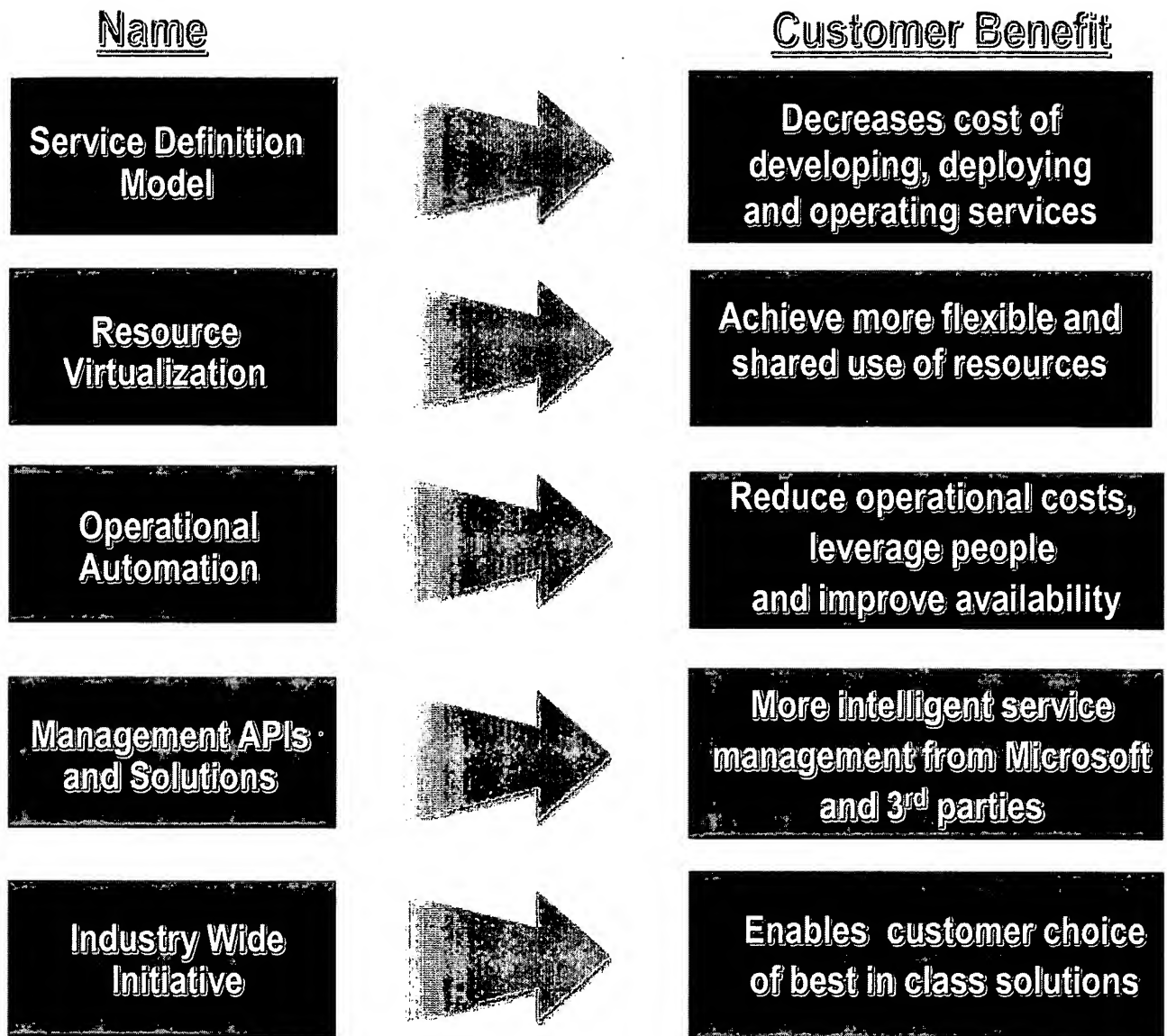
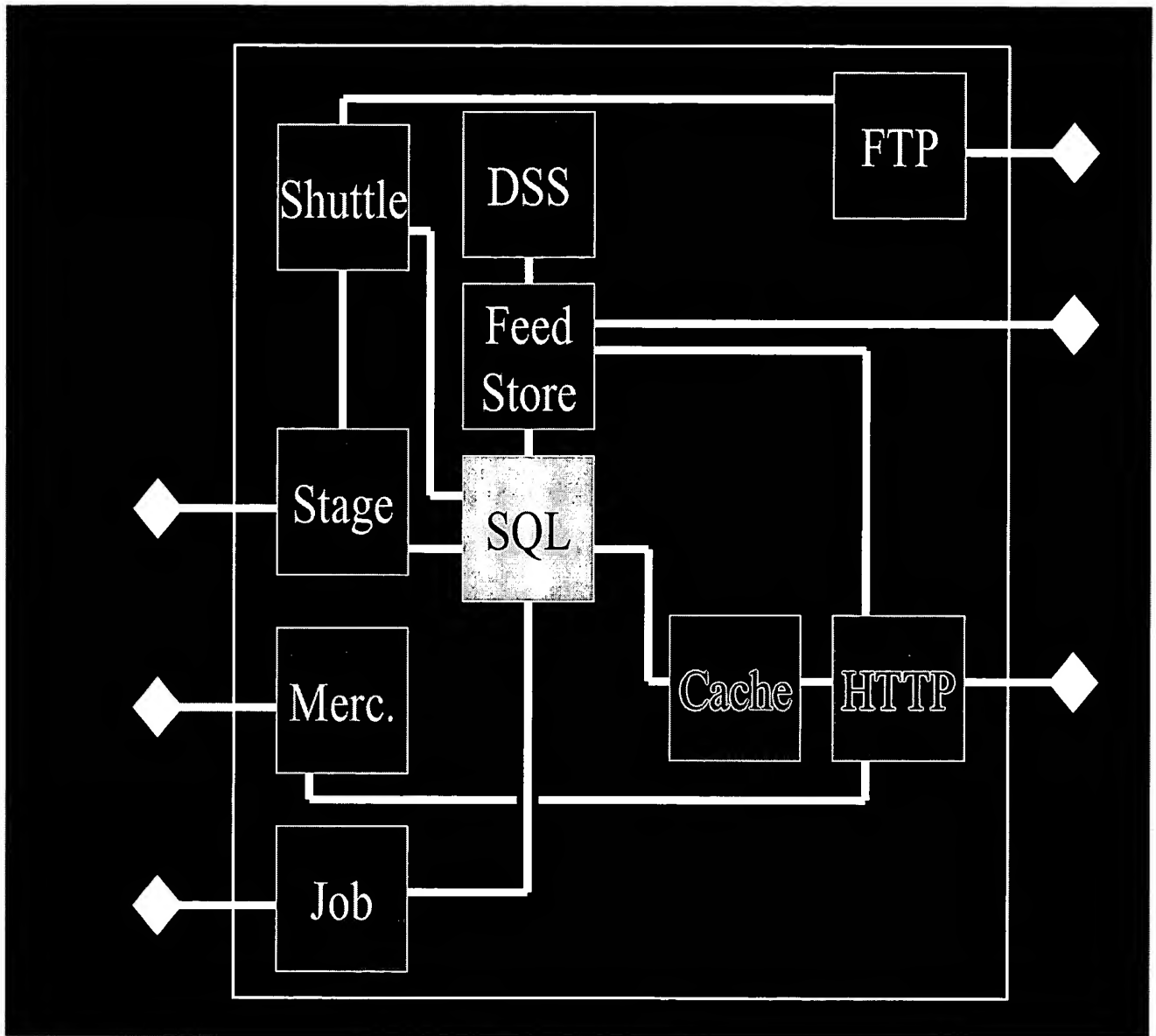
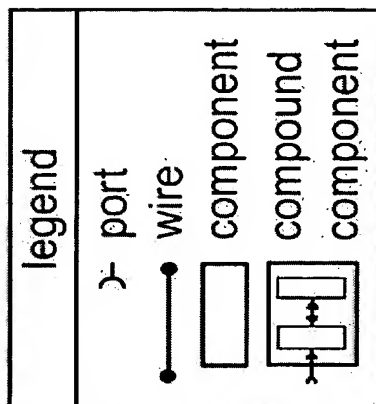
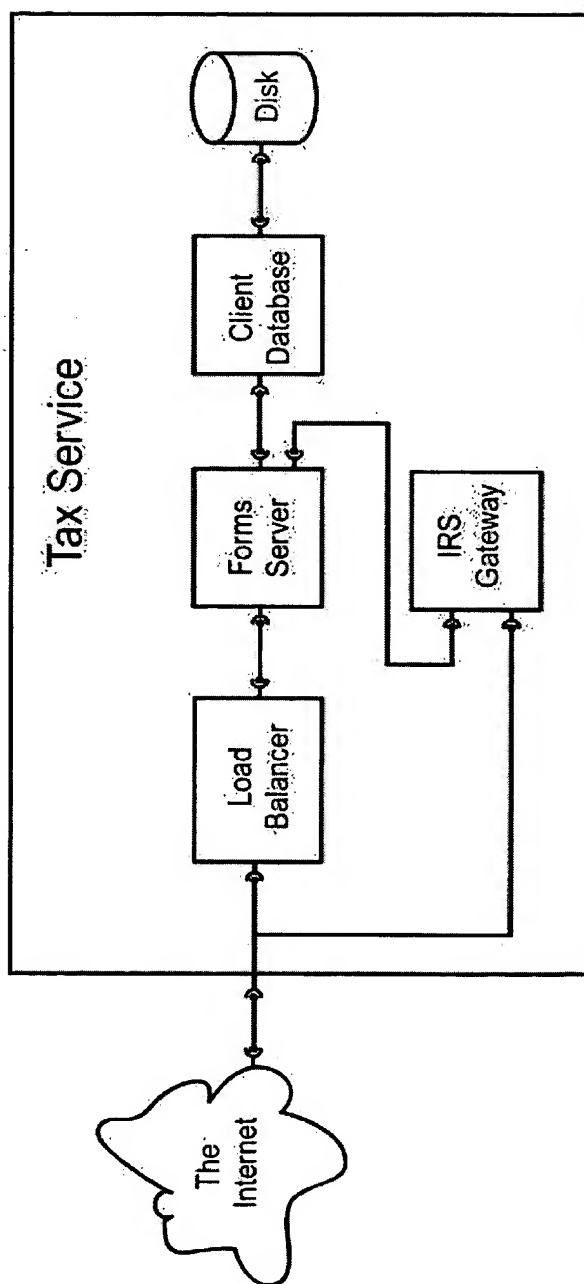


Fig. 106

*Fig. 107*

*Fig. 108*

*Fig. 109*

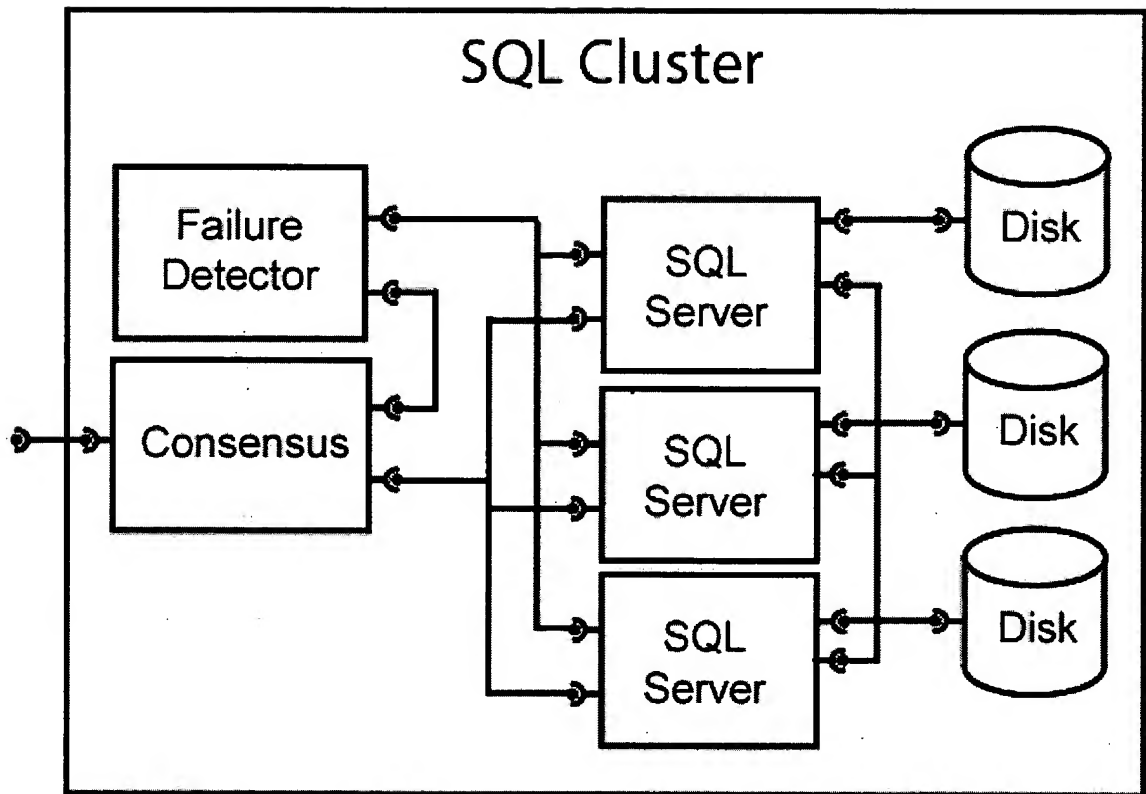


Fig. 110

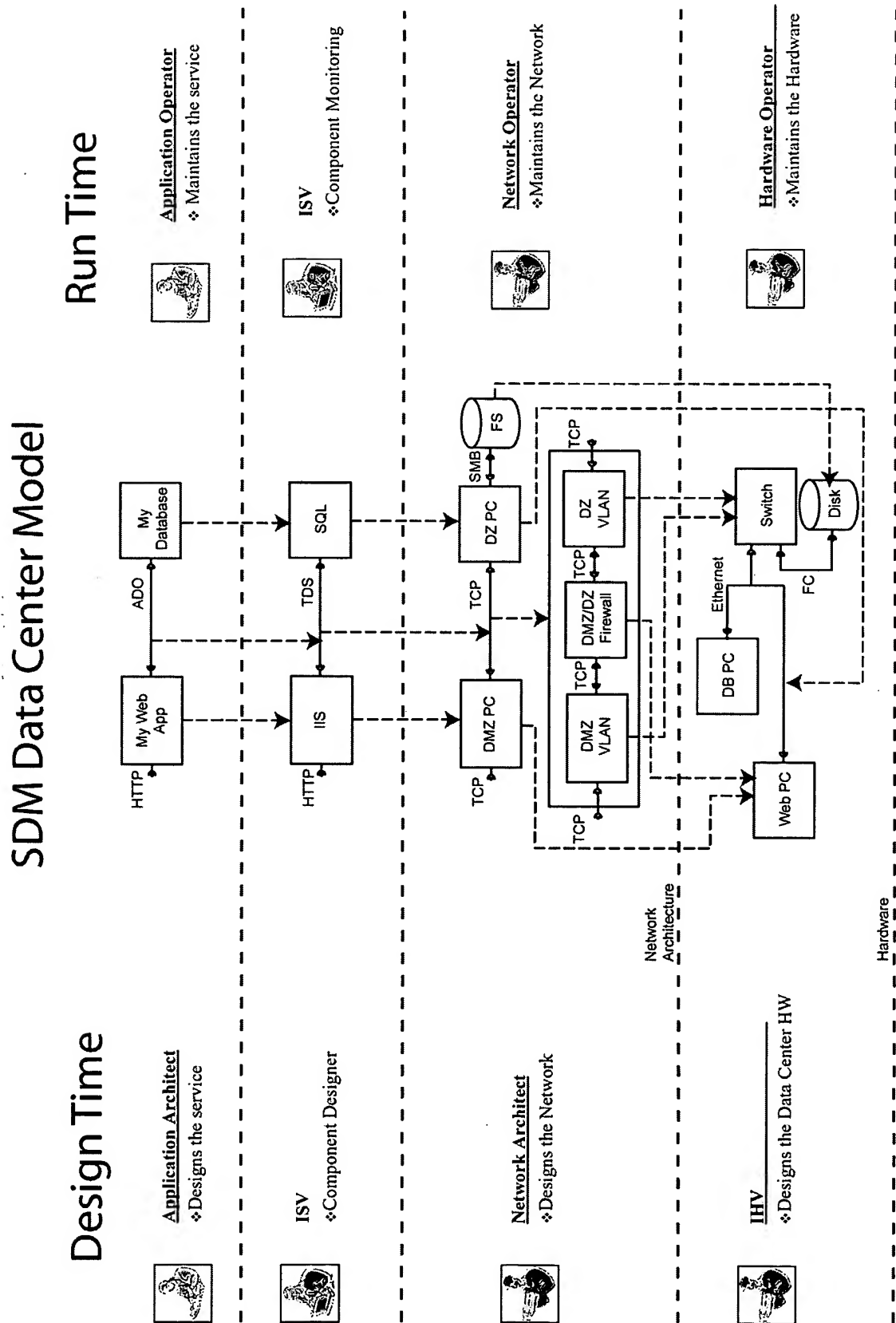


Fig. 111

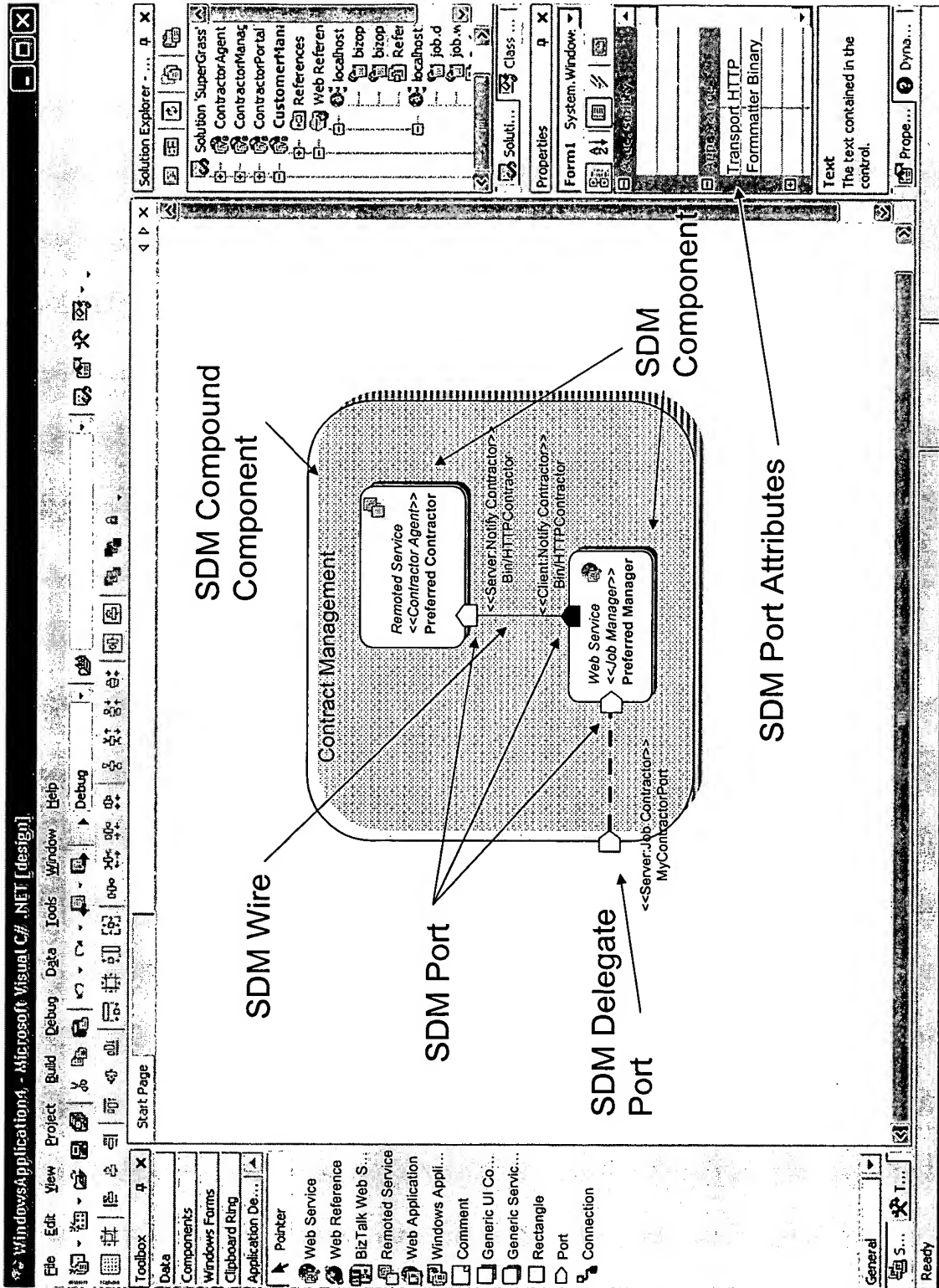


Fig. 112

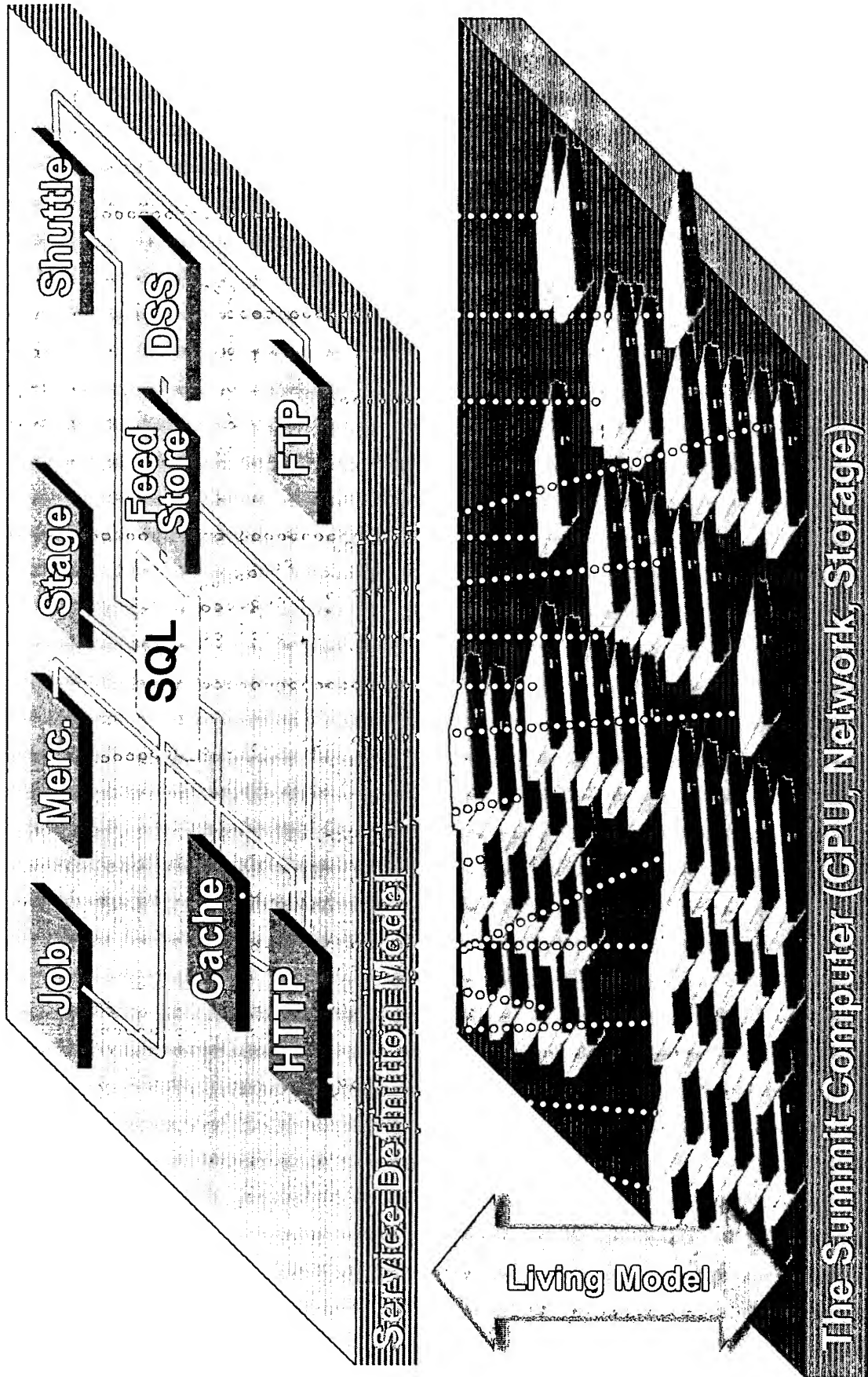


Fig. 113

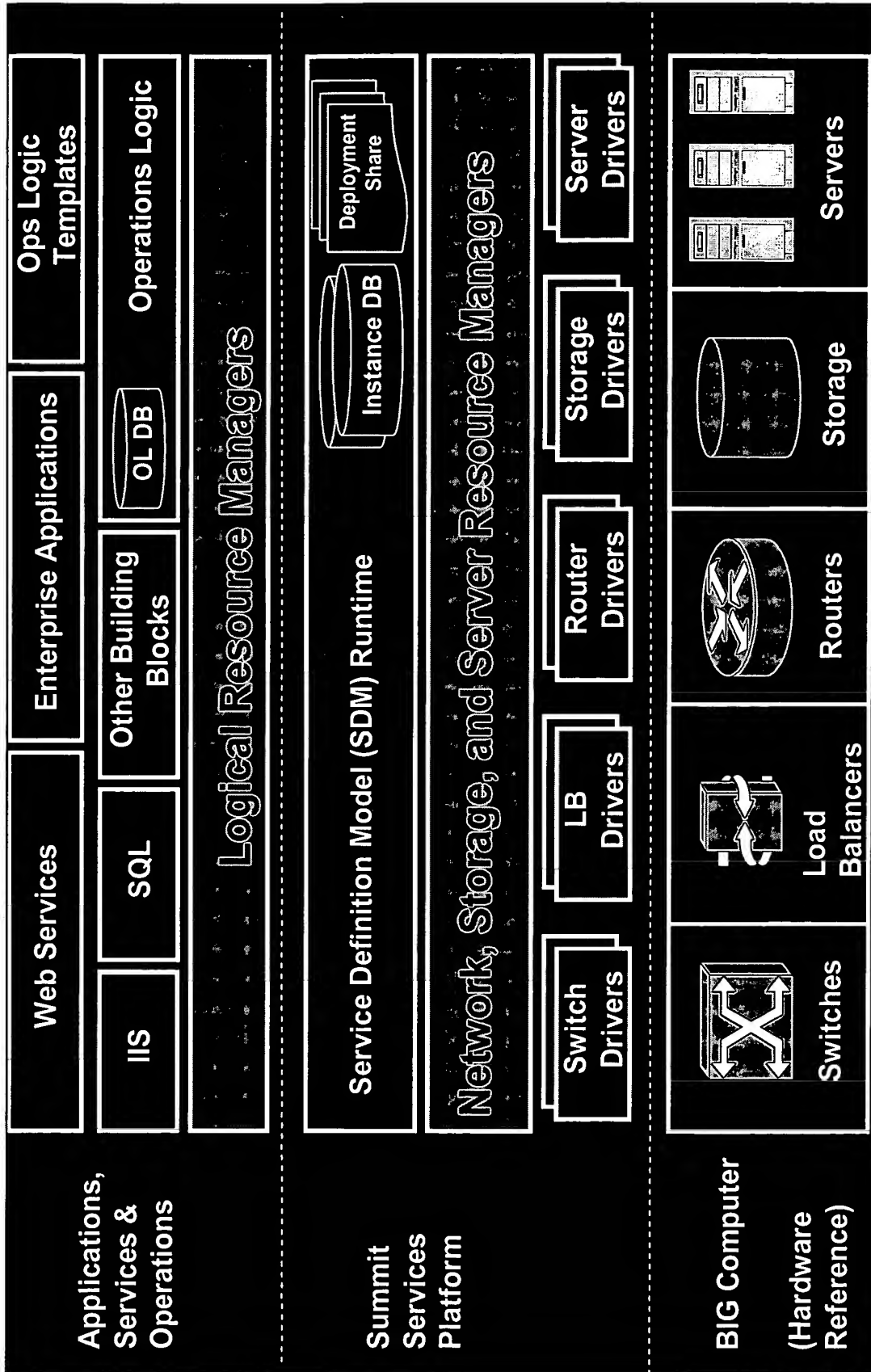
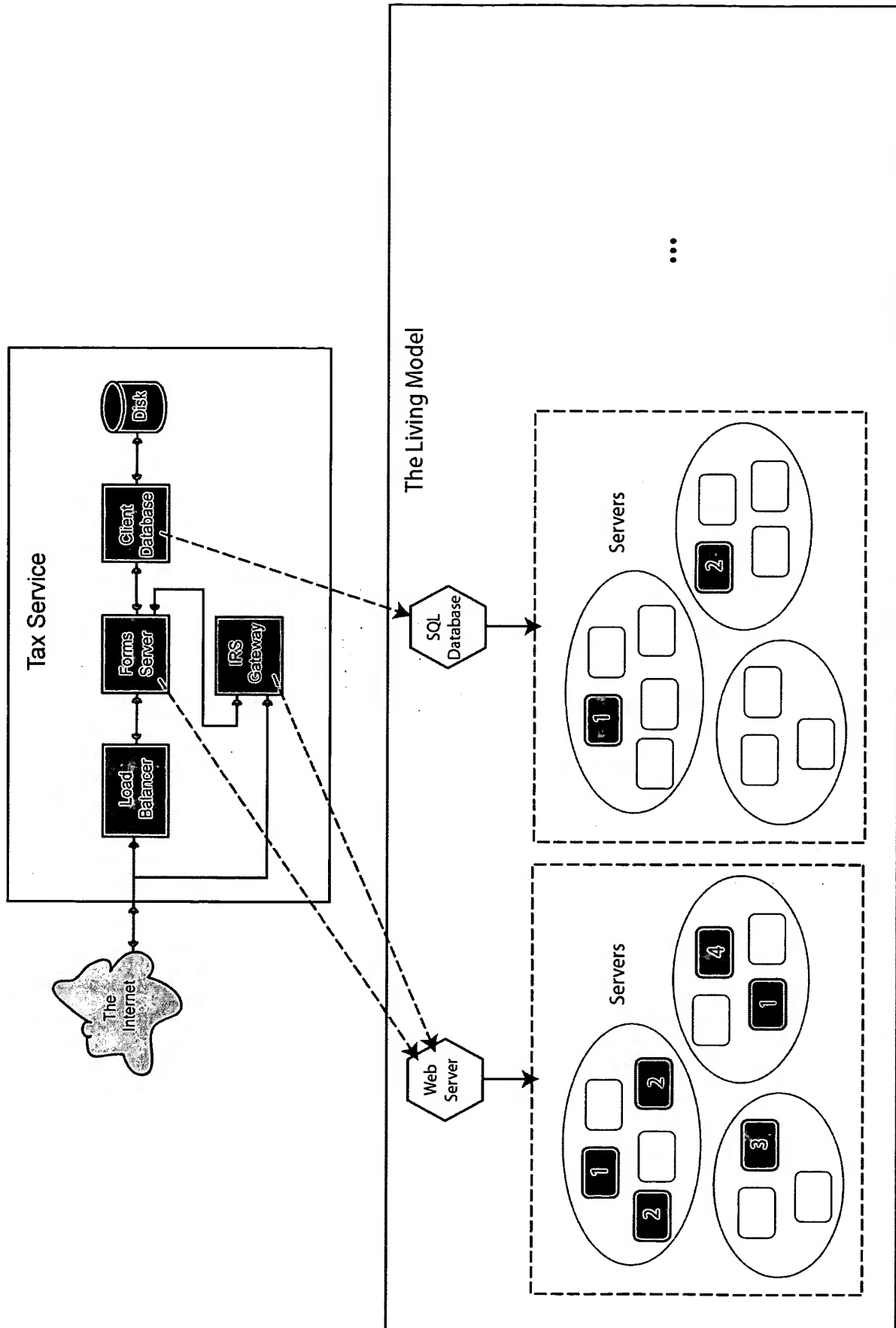


Fig. 114

*Fig. 115*

SDM Data Center Model

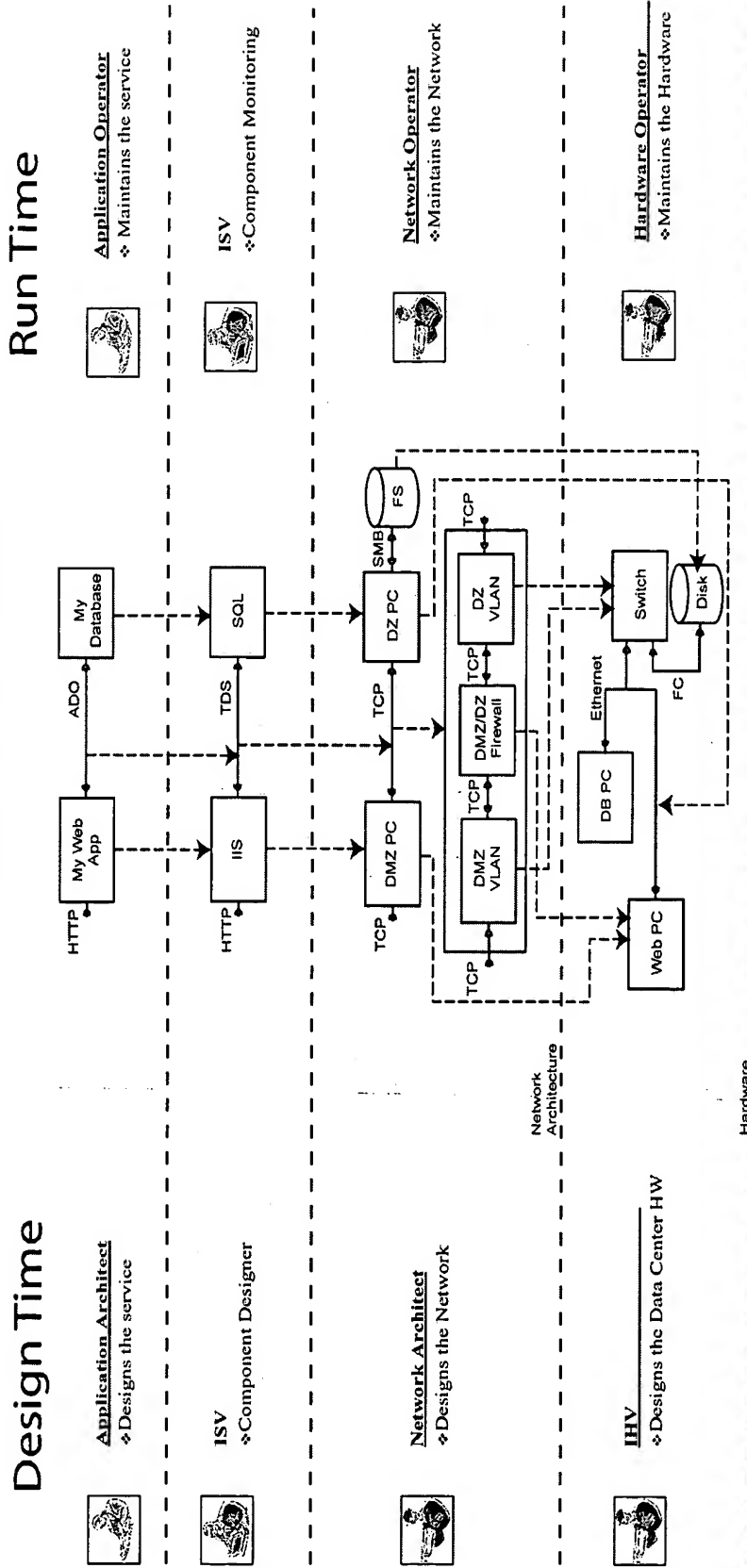
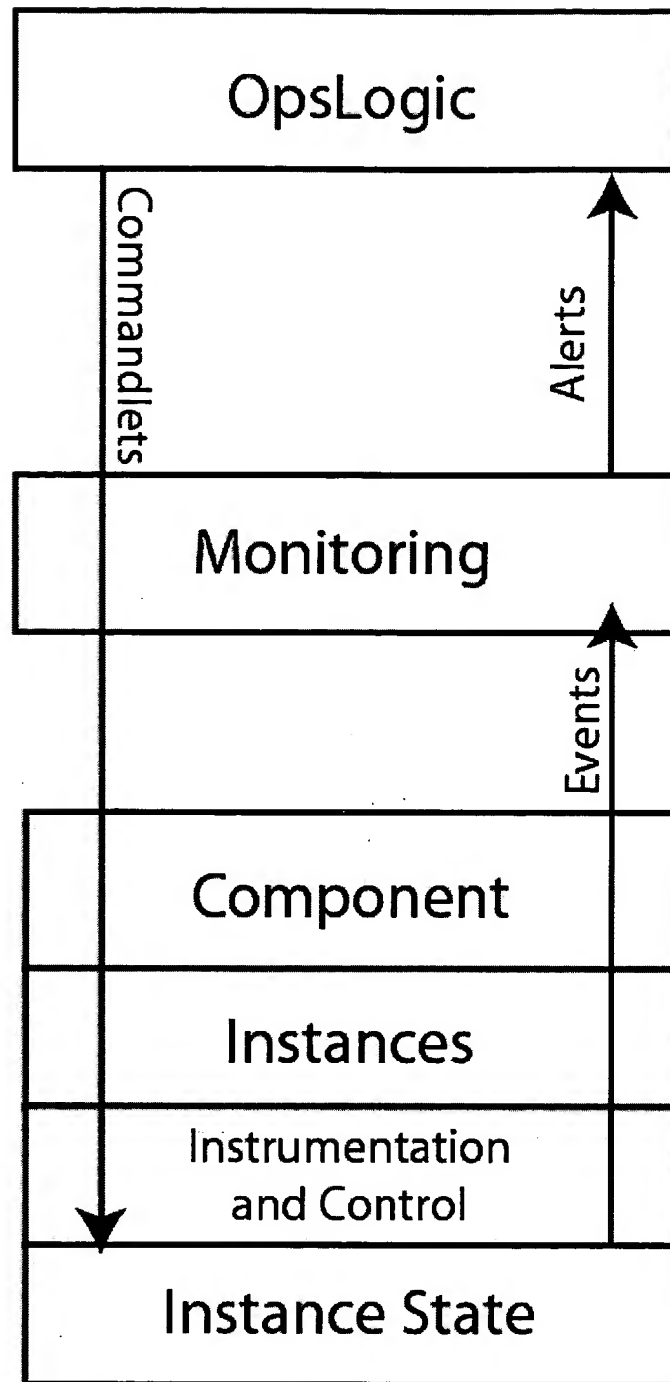


Fig. 116

*Fig. 117*

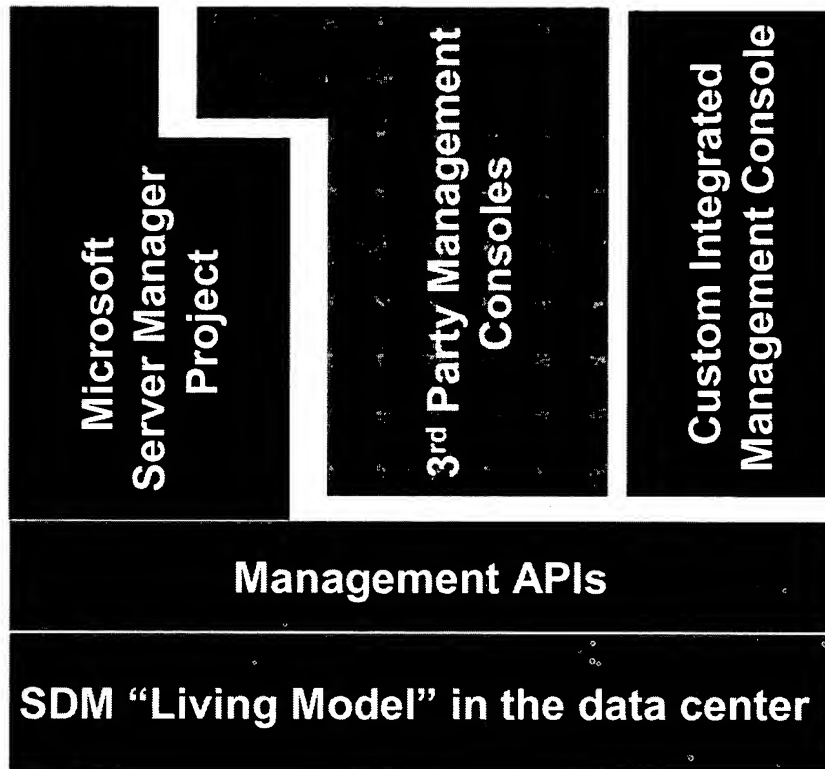


Fig. 118

*Managing heterogeneous
environments via the SDM*

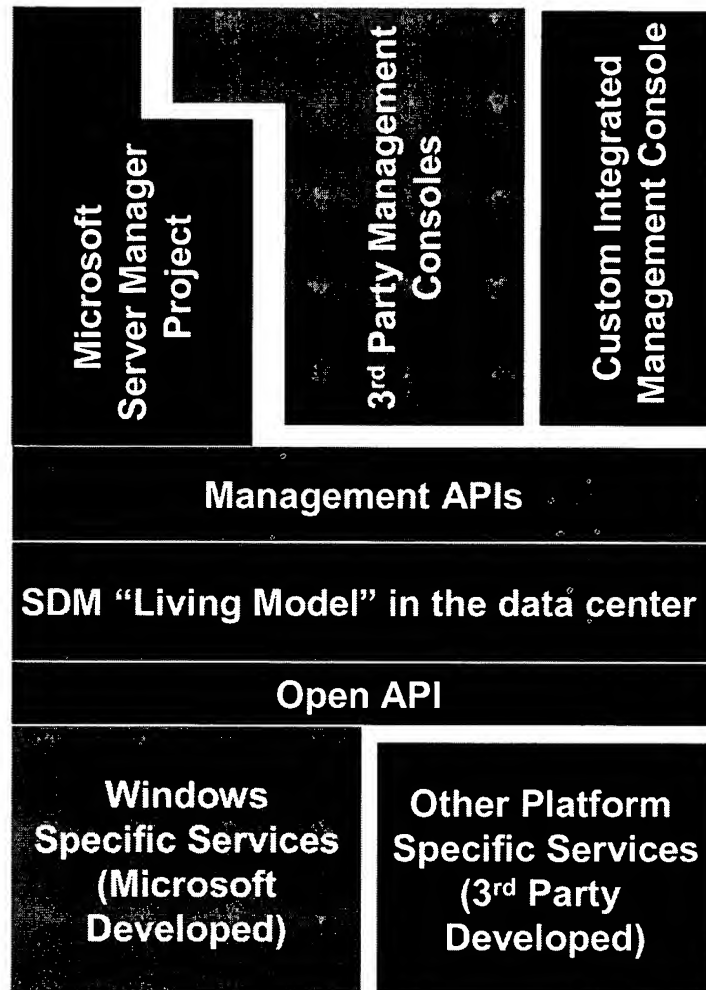


Fig. 119